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ABSTRACT

This report presents national statistics concerning professional and technical personnel in the sciences and engineering employed at institutions of higher education as of January 1976. Information is provided on trends in overall employment levels for: (1) teaching versus research; (2) public versus private universities and colleges; and (3) women scientists and engineers. Emphasis is placed on the distribution of employment by field and type of institution. This report is based on the Survey of Scientific and Engineering Personnel Employed at Universities and Colleges, January 1976. Statistics for scientists, engineers, and technicians employed at federally funded research and development centers are also provided. These statistics cover such topics as field of employment, employment trends, type of institution, type of control, and sex and geographical distribution. Appendices include technical notes, detailed statistical tables, and a reproduction of the questionnaire by which data were collected. (BT)

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Manpower Resources for Scientific Activities at Universities and Colleges January 1976

SE 022 718

Surveys of Science Resources Series
National Science Foundation
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HIGHLIGHTS		
"Employment of Academic Scientists and Engineers Increases 3 Percent in 1976"	76-328	——
"Self-Supported Graduate Science Students Increased by 22 Percent in 1975"	76-320	——
"Academic R&D Spending Up 12 Percent in FY 1975"	76-307	——

FOREWORD

Scientific progress on the challenges and problems that face the Nation depend in large measure on strong academic research and science education programs. Consequently, as part of the National Science Foundation's continuing responsibility to maintain the Nation's scientific capabilities and report on the status of its science resources, this volume presents information on trends and current patterns of employment of professional and technical personnel in the sciences and engineering at universities and colleges.

Some of the major academic science issues that have confronted many institutions of higher education in recent years have involved severe budget constraints in the face of rapidly rising costs, fluctuations in the number of students enrolled in the sciences and engineering, and the combined impact of these factors on the employment of academic scientists and engineers. While many individual institutions—particularly at the undergraduate level—have, in fact, been forced to reduce employment levels, overall employment of academic scientists and engineers has continued to rise at a modest rate.

This report provides information on trends in overall employment levels: in teaching versus research; at public versus private universities and colleges; and for women scientists and engineers. Emphasis is also placed on the distribution of employment by field and type of institution.

This report is based on the Survey of Scientific and Engineering Personnel Employed at Universities and Colleges, January 1976, which complements another NSF report, *Expenditures for Scientific Activities at Universities and Colleges, Fiscal Year 1975* (NSF 77-307).

The Foundation wishes to acknowledge with appreciation the cooperation of university and college officials in responding to the survey.

Charles E. Falk, Director
Division of Science Resources Studies
National Science Foundation

March 1977

general notes

- The data presented in this report are derived from the NSF Survey of Scientific and Engineering Personnel Employed at Universities and Colleges, January 1976. A separate publication, entitled *Detailed Statistical Tables*, which included 60 tabulations from the 1976 survey, was issued in October 1976. Other related documents can be found in the list of *Related Publications* shown on the inside of the front cover of this report.
- Of the 2,210 institutions included, 87 percent or 1,915 responded; NSF provided estimates for the remaining 295 nonrespondents. The 300 doctorate-granting institutions, which account for more than two-thirds of total employment of academic scientists and engineers, had a response rate of 96 percent. The high response rate for the larger institutions accounted for relatively low rates of estimation for most of the aggregated figures. For example, the rate of estimation for total (full-time and part-time) scientists and engineers in 1976 comprised only 8 percent of the universe total. It should be noted that rates of estimation refer only to the portion of the total estimated by NSF and, therefore, do not take into account estimates by the institutions.
- Data for earlier years were adjusted downward to reflect the deletion of historians from survey coverage. In 1975 these reductions amounted to approximately 5 percent for all scientists and engineers and 24 percent for all social scientists.
- Detailed notes on the scope of the survey and limitations of the data are included in the technical notes in appendix A.
- In tables and charts, detail may not add to totals because of rounding.

acknowledgments

This report was prepared in the Universities and Nonprofit Institutions Studies Group by Robert J. Loycano with the assistance of Esther Gist and Richard Bennof. Richard M. Berry, Study Director, supervised the preparation of the report, and William L. Stewart, Head of the R&D Economic Studies Section, provided guidance and review.

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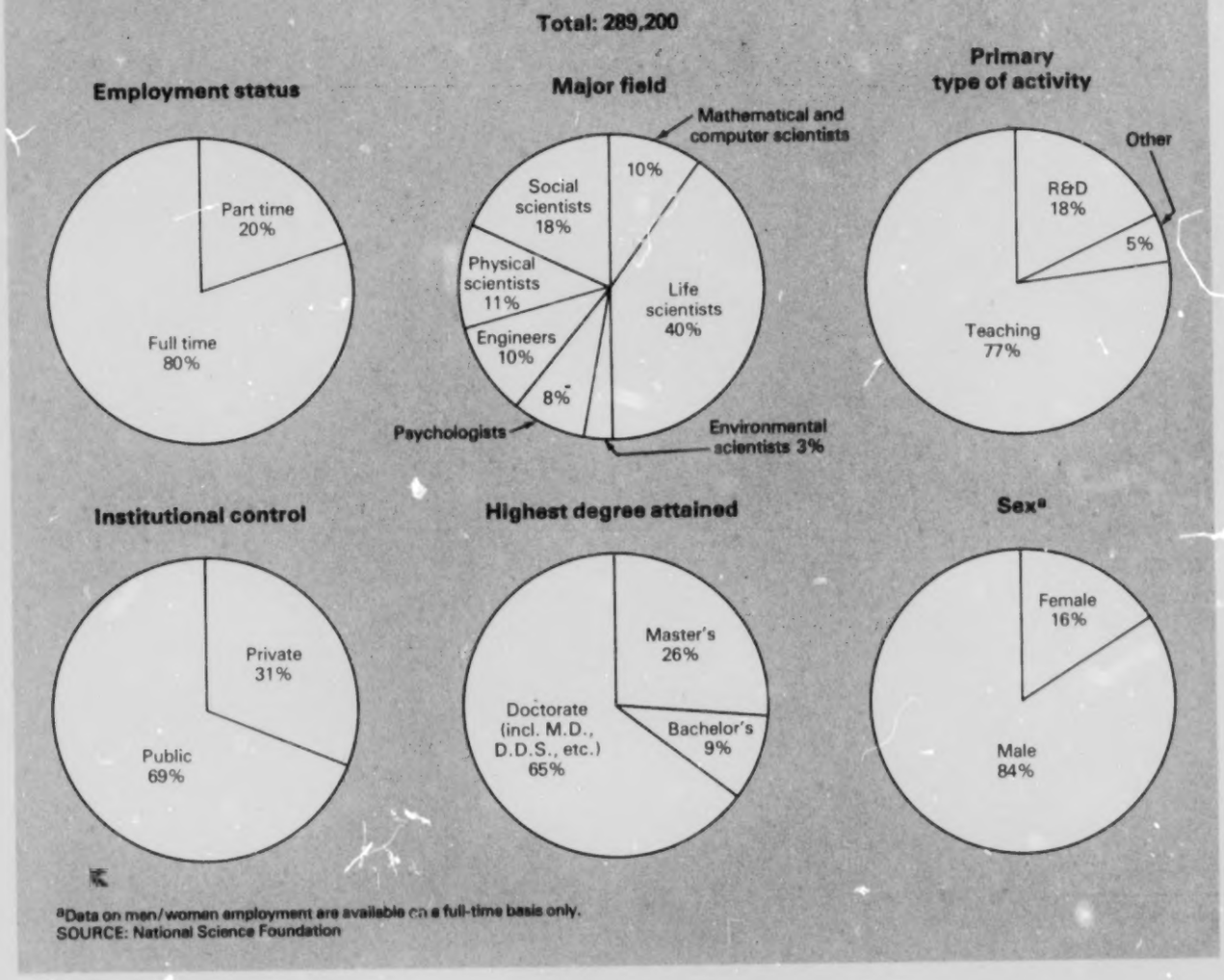
[1] See note on p. 27.

Selected characteristics of scientists and engineers employed at universities and colleges: January 1976



[a]Data on men/women employment are available on a full-time basis only.
SOURCE: National Science Foundation

HIGHLIGHTS

- Employment of all scientists and engineers at universities and colleges increased 3 percent between 1975 and 1976. The number of full-time scientists and engineers at academic institutions rose from 224,800 to 230,500 (a 3-percent increase), while the number of those employed part time grew from 55,900 to 58,700 (up 5 percent).
- Over the last 11 years the number of full-time and part-time scientists and engineers employed at universities and colleges each increased a total of 62 percent. The 1975-76 increase marked the seventh consecutive rise in employment over this period.
- From 1975 to 1976 the movement away from research and development toward teaching continued. Scientists and engineers primarily engaged in teaching rose by 3 percent compared to 2 percent for those primarily employed in R&D activities. Over the 11 years, 1965-76, employment of scientists and engineers primarily involved in teaching went up by 83 percent, while those primarily engaged in R&D activities rose 27 percent.
- The increased emphasis on teaching reflects a response to the demand for more teachers brought about by an overall 63-percent jump in total enrollment in higher education between 1964 and 1975.
- Scientists and engineers primarily engaged in R&D activities have increased at an average annual rate of 1 percent from 1971 to 1976, matching a 1-percent annual rise in academic R&D expenditures (in constant dollars) from 1970 to 1975. This increase is comparable to that experienced in the employment of R&D scientists and engineers in the nonacademic sector of the economy.
- The 1975-76 increase in full-time employment cut across all major fields, with increases ranging from 1 percent in the life sciences and engineering to nearly 7 percent in the social and environmental sciences. Declines were reported, however, for a few detailed categories such as agricultural scientists, down 5 percent, and physicists, down 1 percent.
- Employment of full-time scientists and engineers at private universities and colleges totaled 68,400 in 1976, an increase of 2 percent over the 1975 level. The 1975 to 1976 rise, although modest, stands in contrast with the near zero growth over the previous 6 years. Public institutions employed 162,100 full-time scientists and engineers in 1976, an increase of 3 percent over 1975, or somewhat lower than the nearly 5-percent average for the 1969-75 period.
- The number of women employed full time as scientists and engineers by universities and colleges numbered 35,900 in January 1976, representing the second consecutive annual increase of 5 percent. By contrast, men, who far outnumber women in total employment with 194,600, recorded increases of only 2 percent in each of the last 2 years. Despite the higher growth rate of women, there has been little change in their share of the full-time scientist and engineer total—up from 15 percent to 16 percent from 1974 to 1976.
- Scientists and engineers primarily engaged in R&D activities show a higher degree of concentration than all scientists and engineers. Fifty universities, representing 2 percent of all institutions surveyed, accounted for one-third of all full-time scientists and engineers, but nearly two-thirds of all full-time scientists and engineers primarily engaged in R&D activities.
- There were 56,400 technicians reported in universities and colleges in 1976, a 2-percent decline from the previous year's total. This reduction follows a 10-year period in which technicians grew at an average annual rate of 6 percent. In 1976 life science technicians totaled 36,600 and accounted for 65 percent of all technicians. This total represented a decline of 6 percent in life science technicians since 1975 and was almost solely responsible for the overall decline in the employment of technicians in 1976.
- Federally Funded Research and Development Centers (FFRDC's) administered by universities and colleges employed 13,300 scientists and engineers in January 1976, a 6-percent increase over the 12,500 reported in 1975. In 1976, as in 1975, over four-fifths of all full-time scientists and engineers employed in university-administered FFRDC's were working in either engineering (46 percent) or the physical sciences (36 percent). By contrast, slightly over one-fifth of all full-time scientists and engineers at universities and colleges were employed in either engineering or the physical sciences in 1976.

INTRODUCTION

This report presents the results of the National Science Foundation's Survey of Scientific and Engineering Personnel Employed at Universities and Colleges, January 1976. It deals exclusively with the employment of professional and technical personnel in the sciences and engineering.

The survey complements a separately conducted survey on academic R&D expenditures in the sciences and engineering. Compatible time series data at aggregate levels are available for both surveys for the period 1965-76. Up until 1971 the expenditures and manpower data were presented in a combined report, but because of different time frames for the two sets of data they are now collected in separate surveys. The latest report released on the expenditure survey series is entitled *Expenditures for Scientific Activities at Universities and Colleges, Fiscal Year 1975* (NSF 77-307).

The NSF manpower survey was conducted on a biennial basis until 1973. Due to increasing interest expressed by the National Science Board, other parts of the Foundation, as well as by other Government, academic, and research institution specialists, in information concerning the supply and utilization of science resources, the survey has been conducted on an annual basis since 1973.

Data obtained by this survey included employment figures for scientists and engineers and science and engineering (S/E) technicians as of January 1976. Graduate students receiving stipends for part-time S/E services were omitted from the survey for the first time beginning in 1976. It was determined that the graduate student data effort duplicated that in NSF's Survey of Graduate Science Student Support and Postdoctorals. The latest report on that survey is entitled *Graduate Science Education: Student Support and Postdoctorals, Fall 1974* (NSF 76-313). In addition, historians were deleted from the survey, beginning in 1976. Data for earlier years were adjusted downward to reflect the deletion as mentioned in the general notes.

Data presented for universities and colleges in part I do not include data for associated Federally Funded Research and Development Centers (FFRDC's). Separate returns were received from 21 FFRDC's and are analyzed in part II.

Details on the scope, coverage, methods of estimating, and limitations of the survey, are discussed in the technical notes in appendix A. Detailed statistical tables on the manpower survey were released separately in October 1976 as appendix B (NSF 76-321). Repeated for reference in appendix B is a summary questionnaire for all academic institutions along with selected other tabulations and a summary questionnaire for the 21 university-associated FFRDC's. Sample survey materials, including the questionnaire and instructions, are included in appendix C.

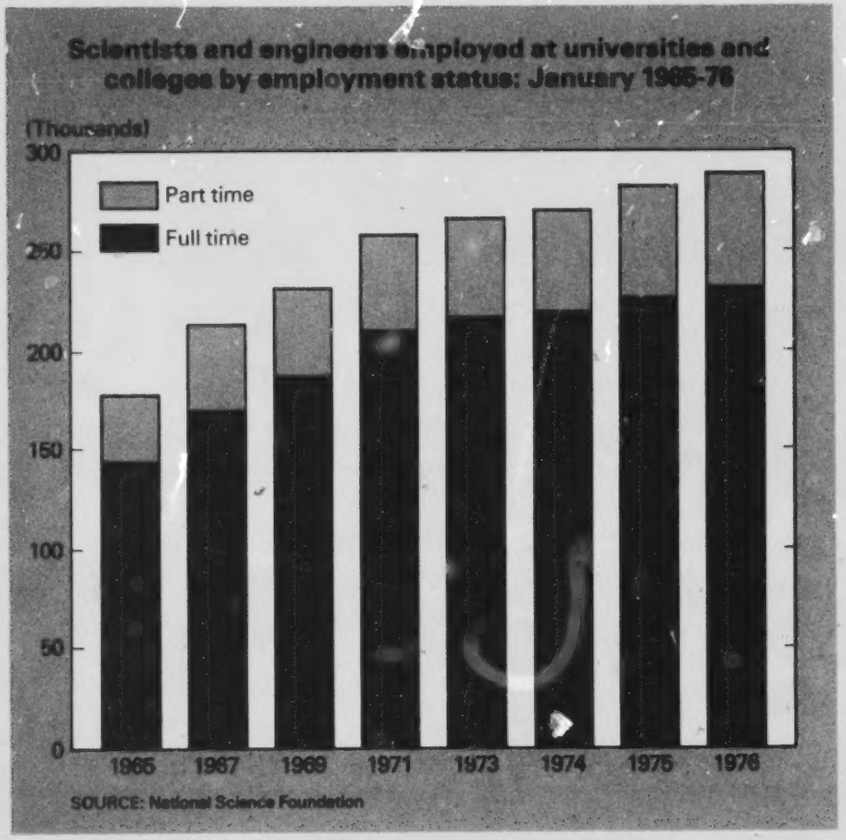
Part I
UNIVERSITIES AND COLLEGES

Section 1. EMPLOYMENT OF SCIENTISTS AND ENGINEERS

This section focuses principally on employment of full-time and part-time scientists and engineers at universities and colleges. For the purpose of this study, scientists and engineers include compensated faculty members, postdoctorals, and other professional staff engaged in teaching, research and development, and other science activities in any of 22 specific science and engineering (S/E) categories. (See appendix C for complete survey instructions.)

Trends

Over the last 11 years the number of full-time and part-time scientists and engineers employed at universities and colleges each increased a total of 62 percent, to levels of 230,500 and 58,000, respectively, in January 1976. All scientists and engineers (full-time and part-time) showed a 3-percent increase from 1975 to 1976, marking the seventh consecutive rise in employment over this period. While the major portion of this growth occurred during the 1965-71 period, low-to-moderate increases have continued since 1971.



FIELD OF EMPLOYMENT

The average rate of growth for each of the major fields of employment declined considerably between the two periods 1965-71 and 1971-76. All of the categories except psychology and the social sciences, had their annual rates of growth cut by more than one-half between the two intervals. Over the last 5 years three of these four major categories, increasing at less than the 2.3 percent average annual rate, were engineers (0.8 percent), life scientists (1.0 percent), and physical and environmental scientists (2.1 percent).

Very low growth or actual reductions in employment in several of the detailed occupational categories help to explain the below-average growth in three major fields during the last 5 years. Among the notable employment changes occurring over the 1971-76 period were aeronautical and astronautical engineers—down a total 23 percent; mechanical engineers—down 2 percent; chemical engineers—down 1 percent; and electrical engineers—up less than 1 percent. In the life scientists category, agricultural scientists registered a 22-percent decline while medical scientists showed only a 2-percent gain.[1] Among the physical and environmental scientists, physicists showed the lowest total growth—less than 0.5 percent.

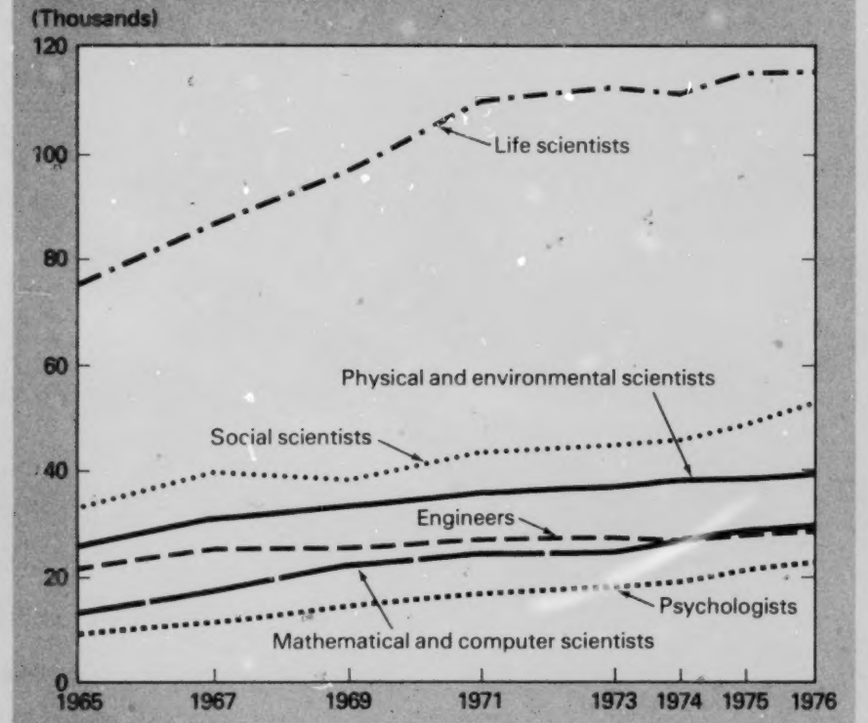
Major categories that showed relatively high employment growth in both the 1965-71 and 1971-76 periods were mathematical and computer scientists—up at annual rates averaging 10.2 percent and 4.0 percent, respectively; psychologists—up at annual rates of 10.1 percent and 6.3 percent; and social scientists—up at annual rates of 4.7 percent and 4.0 percent for the two periods.

[1] Fluctuations cited for agricultural and medical scientists must be viewed with some caution since a sizable portion of the noted changes in employment levels may be due to incompatibility of year-to-year data for these categories.

From 1971 to 1976 detailed social scientists categories that contributed to the sustained growth of this major field were sociologists—up 34 percent; and political scientists—up 27 percent for the 5-year period.

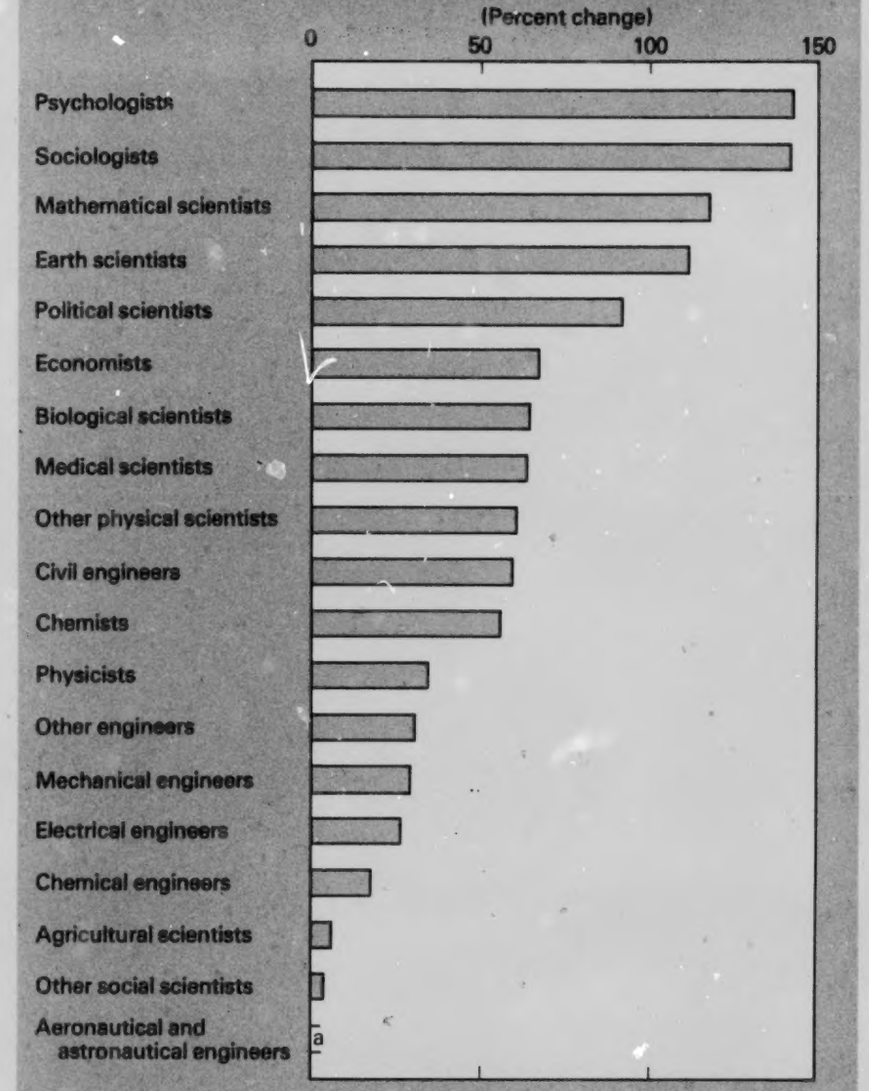
Total growth, 1965-76. Among 19 occupational categories for which data can be traced back to 1965, employment growth for the entire 11-year span ranged from zero (aeronautical and astronautical engineers) to 142 percent (psychologists and sociologists). Over the entire period, employment growth in engineering and the natural sciences fell well below that in the psychological and social sciences. Five of the six engineering fields, for example, showed relative growth below the median level of 59 percent. Moreover, agricultural scientists and physicists showed employment growth that fell far short of the median growth, with 11-year increases measuring only 5 percent and 34 percent, respectively.

Scientists and engineers employed in universities and colleges by field of employment: 1965-76



SOURCE: National Science Foundation

Scientists and engineers employed in universities and colleges by detailed field: January 1965-76

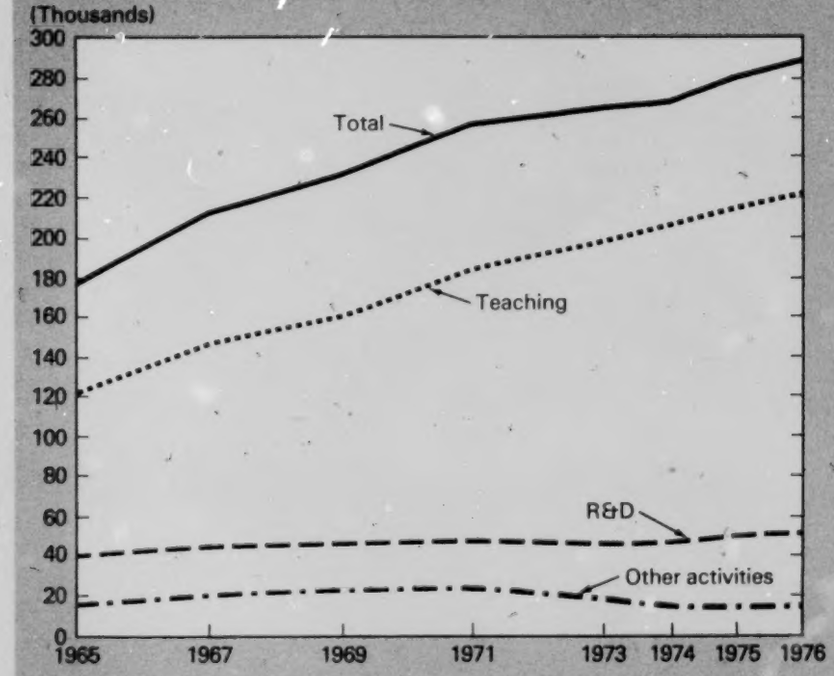


[a]No change.
SOURCE: National Science Foundation

TYPE OF ACTIVITY

Over the 11 years 1965-76, employment of scientists and engineers primarily engaged in teaching grew by 83 percent, while those primarily engaged in research and development rose by only 27 percent. The share of total employment accounted for by those primarily involved in teaching increased from 68 percent to 77 percent, while those primarily engaged in R&D activities declined from 22 percent to 18 percent. From 1975 to 1976 there was a continuation of the trend away from research and development toward teaching. Scientists and engineers primarily engaged in teaching rose by 3 percent compared to 2 percent for those primarily employed in R&D activities.

Scientists and engineers employed at universities and colleges by primary type of activity: January 1965-76



SOURCE: National Science Foundation

The number of scientists and engineers primarily engaged in teaching increased 52 percent during 1965-71, or over 7 percent annually, while the number of those primarily employed in research and development grew by 21 percent, or at 3 percent per year. Although employment growth slowed for both types of activities during the next 5 years, the number of scientists and engineers primarily employed as teachers continued to rise at a considerably higher rate than did those primarily engaged in R&D activities. During the 1971-76 period, scientists and engineers primarily employed in teaching grew nearly 21 percent, or about 4 percent annually, while those primarily employed in research and development increased only 6 percent, or only 1 percent per year.

Higher growth in the number of scientists and engineers primarily engaged in teaching during the 1965-76 period is attributable, in part, to the slowdown in the rate of Federal funding of academic research during this time. Federal support, in constant dollars, slipped from an average annual growth rate of 5 percent during 1964-72 to a slight decline from 1972-75. The increased emphasis on teaching also reflects a response to the demand for more teachers brought about by an overall 63-percent jump in total enrollment in higher education between 1964 and 1975. During that period the number of bachelor's and first-professional degrees conferred in the sciences and engineering nearly doubled, as did the number of 2-year colleges, where teaching accounts for 98 percent of employed scientists and engineers.

From 1971 to 1976 the low level of growth in employment of academic scientists and engineers primarily engaged in R&D activities is, in large measure, a reflection of the low growth in total R&D expenditures by universities and colleges over this period. For the 1970-75 period R&D constant-dollar expenditures also increased at an average annual rate of 1 percent.

The academic sector has shown about the same level of growth in research manpower as other sectors of the economy. As a result, universities and colleges continue to account for approximately one-eighth of total R&D manpower in the United States.[2]

[2] For the purpose of this comparison academic sector data include graduate students employed as scientists and engineers.

Full-time Scientists and Engineers

INSTITUTIONAL CONTROL

In January 1976 employment of full-time scientists and engineers at private institutions of higher education totaled 68,400—an increase of 2 percent over the January 1975 level. The 1-year rise, although not large, contrasts with the steady state of private institution employment reported from 1969[3] to 1975.

Public institutions employed 162,100 full-time scientists and engineers in 1976, an increase of 3 percent over 1975, or somewhat lower than the nearly 5-percent average for the entire 1969-74 and 1974-75 periods. The proportion of full-time scientists and engineers employed in publicly controlled institutions grew from 64 percent in 1969 to 70 percent in 1976, with a concurrent drop in the proportion of full-time employment in private institutions.

Field of Employment

Life scientists continue to represent the largest share of employment at both public and private institutions. In 1976 they comprised 39 percent of the total at public institutions and 43 percent at private institutions.

In most of the major categories of employment public institutions showed higher rates of growth than private institutions over the 1969-76 span. Engineers, for example, increased at an annual rate of 1 percent to 3 percent at public institutions, but declined at an annual rate of 3 percent to 5 percent at private institutions.

Over the last 7 years there have been some shifts in the relative levels of major employment categories. Engineers declined from 12 percent to 10 percent of total scientists and engineers at public institutions and from 11 percent to 8 percent at private institutions. The largest increases at public institutions occurred among psychologists and social scientists who increased their shares from 6 percent to 7 percent and 17 percent to 18 percent, respectively. Private institutions showed similar gains in both categories, but the largest increase at private institutions occurred among life scientists, who climbed from a 40-percent share to 43 percent of the total.

[3] The first year in which data on control of the institution were available was 1969.

Full-time scientists and engineers employed in universities and colleges, by field of employment and institutional control: January 1969-76

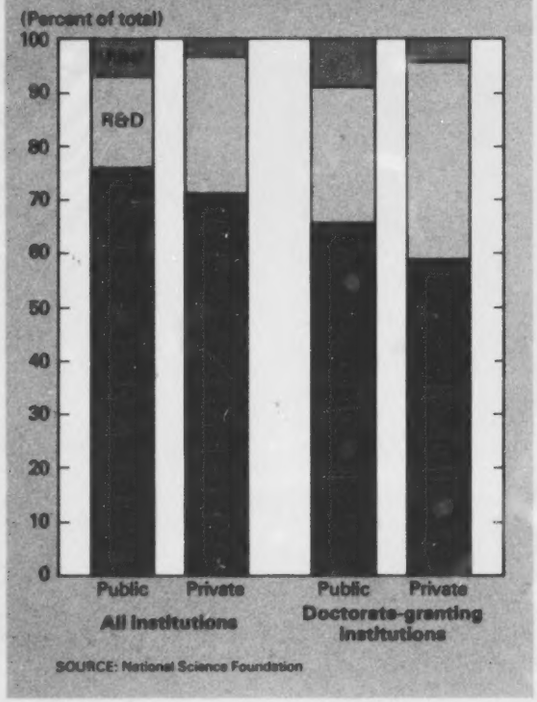
Field of employment and control	January				Average annual percent change, 1969-74	Percent change, 1974-75	Percent change, 1975-76
	1969	1974	1975	1976			
Total	187,100	218,800	224,800	230,500	3.2	2.7	2.6
Public	120,300	150,900	157,700	162,100	4.6	4.5	2.8
Private	66,800	67,900	67,000	68,400	.4	-1.3	2.1
Engineers	21,400	22,800	22,600	22,800	1.2	-.8	1.0
Public	14,200	16,400	16,600	17,000	3.0	1.0	2.7
Private	7,200	6,400	6,000	5,800	-2.6	-5.4	-3.7
Physical and environmental scientists	30,000	33,400	33,500	34,400	2.2	.2	2.9
Public	18,600	22,600	22,900	23,800	4.0	1.0	4.3
Private	11,400	10,800	10,600	10,600	-1.1	-1.5	-.2
Mathematical and computer scientists	18,400	22,200	22,400	23,100	3.8	1.1	3.1
Public	12,200	16,200	16,600	17,200	5.8	2.5	3.6
Private	6,200	6,000	5,800	5,900	-.6	-2.7	1.4
Life scientists	74,900	88,900	92,000	92,600	3.5	3.5	.6
Public	47,900	59,600	63,200	63,100	4.5	6.1	-.2
Private	27,000	29,300	28,800	29,500	1.6	-1.8	2.5
Psychologists	11,500	15,000	16,000	16,800	5.3	6.9	4.8
Public	7,500	10,300	11,300	12,000	6.7	9.4	6.6
Private	4,100	4,600	4,700	4,700	2.7	1.4	.3
Social scientists	30,900	36,700	38,300	40,900	3.5	4.6	6.6
Public	20,000	25,700	27,200	29,000	5.2	5.7	6.4
Private	10,900	10,900	11,100	11,900	.1	2.0	7.1

SOURCE: National Science Foundation

Type of Activity and Institution

Public and private institutions have traditionally shown a sizable difference in the degree of emphasis placed on research. In 1976, for example, scientists and engineers primarily engaged in R&D activities made up only 17 percent of full-timers at public institutions, but comprised nearly 26 percent of full-timers at private institutions. Among doctorate-level institutions, which account for 98 percent and 99 percent of R&D scientists and engineers employed at public and private institutions, respectively, the difference was more pronounced—24 percent versus 37 percent.

Full-time scientists and engineers employed at universities and colleges, by type and control of institution and primary activity: January 1976



SOURCE: National Science Foundation

Full-time scientists and engineers employed at universities and colleges, by type and control of institution: January 1975 and 1976

Type and control of institution	1975		1976	
	Number	Percent	Number	Percent
Total, all institutions	224,800	100.0	230,500	100.0
Public	157,700	70.2	162,100	70.3
Private	67,000	29.8	68,400	29.7
Institutions granting degrees in science/engineering:				
Doctorates	149,100	66.3	154,200	66.9
Public	103,800	46.2	107,500	46.6
Private	45,300	20.2	46,700	20.3
Master's	27,500	12.2	26,400	11.4
Public	22,500	10.0	21,200	9.2
Private	5,000	2.2	5,100	2.2
Bachelor's	22,700	10.1	23,000	10.0
Public	8,400	3.7	8,400	3.6
Private	14,300	6.4	14,600	6.3
Other degrees	800	.4	500	.2
Public	200	.1	200	.1
Private	700	.3	300	.2
2-year institutions	24,600	10.9	26,400	11.5
Public	23,000	10.2	24,900	10.8
Private	1,700	.7	1,600	.7

SOURCE: National Science Foundation

In most categories there was little change in the percent distribution of full-time scientists and engineers by type and control of institution for 1975 and 1976. At public master's institutions and public 2-year institutions, however, there was evidence of slight shifts in the proportions of full-timers employed. Public master's institutions showed a decline in their share, from 10.0 percent to 9.2 percent, while public 2-year institutions increased their proportion from 10.2 percent to 10.8 percent. These shifts were attributable to a 5-percent decline and an 8-percent increase, respectively, in employment levels in these two categories.

Doctorate-granting institutions accounted for little more than one-eighth of the total number of institutions with science programs in 1976, but they employed two-thirds of all full-time scientists and engineers.

Master's-granting institutions were the only group showing employment in proportion to their representation in the survey. These institutions made up one-eighth of total institutions surveyed and nearly one-eighth of all full-time scientists and engineers.

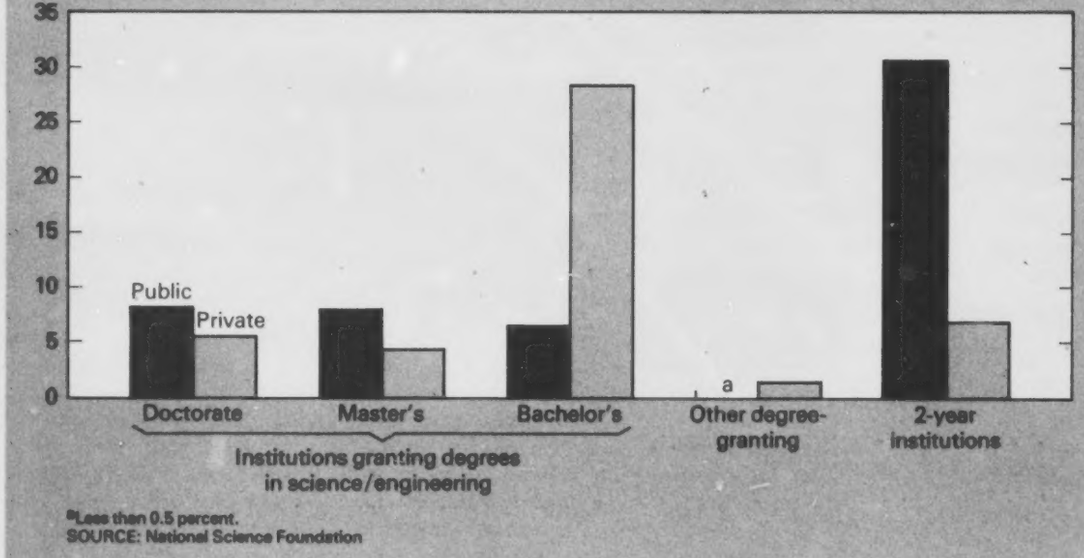
Bachelor's and 2-year institutions together comprised more than 72 percent of institutions surveyed, but accounted for little more than 21 percent of full-time employment.

There were significant differences between public and private institutions in their distribution by size and level of institution. Overall, the number of public institutions comprised 53 percent of the total. Thus, the dominance of public institutions must be explained not in terms of numbers of institutions under each type of control, but rather in differences in level and size of institution. In the doctorate-granting category, for example, public universities held a three-to-two margin over private universities in number of institutions, but nearly a five-to-two margin in terms of total full-time scientists and engineers.

Private doctorate-granting institutions averaged less than 400 full-time scientists and engineers per institution, while public doctorates averaged nearly 600 full-timers. The relative difference is more pronounced at each of the other levels. In each category private institutions averaged less than one-half the number of full-timers employed at comparable public institutions.

More than one-half of all private institutions surveyed were relatively small bachelor's-granting institutions. These 4-year institutions represented 28 percent of all institutions surveyed but accounted for only 6 percent of total full-time scientists and engineers.

Universities and colleges by type and control of institution: January 1976

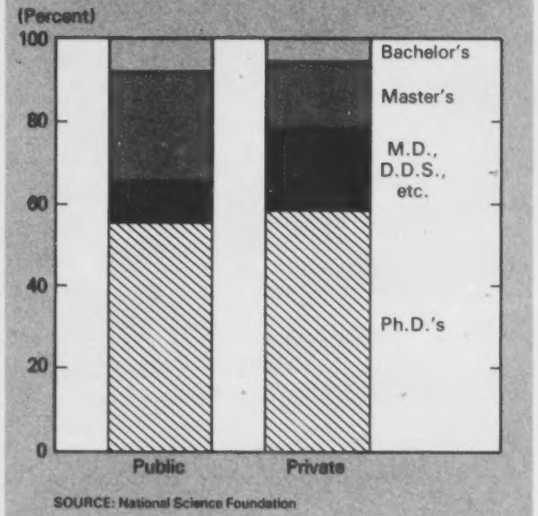


[a]Less than 0.5 percent.
SOURCE: National Science Foundation

Doctorate-holders

In January 1976 the proportion of full-time Ph.D. scientists and engineers employed at private institutions—58 percent—was somewhat higher than that at public institutions—55 percent.

Full-time scientists and engineers employed at universities and colleges, by institutional control and level of attainment: January 1976



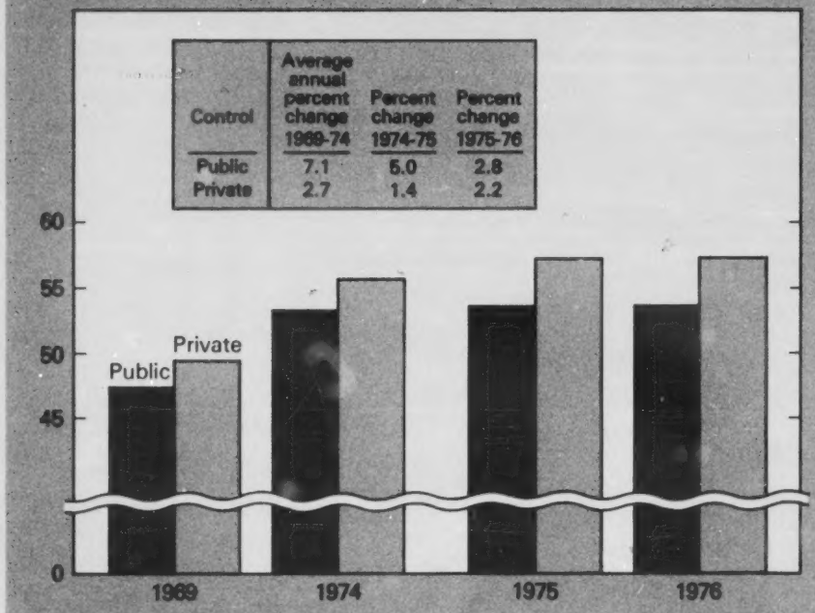
SOURCE: National Science Foundation

The proportion of full-time scientists and engineers holding a Ph.D. degree at private institutions has consistently remained 3 percentage points above that at public institutions, despite the significantly higher growth in Ph.D. employment at public institutions. The proportions show a wider spread if other doctorate-holders, such as M.D.'s, D.D.S.'s, Ed.D.'s, etc., are deleted from the total. Without these other doctorate-holders in the base totals, private institutions showed 73 percent with a Ph.D. degree, compared to 61 percent for public institutions. A small part of this gap can be attributed to employment of scientists and engineers who do not hold a doctorate degree at the large number (668) of public 2-year institutions. Even among doctorate-granting institutions, however, the gap is substantial. Private doctorate-granting institutions reported that 79 percent of their full-timers (excluding M.D.'s, D.D.S.'s, Ed.D.'s, etc.) held a Ph.D. degree, while public institutions reported a corresponding figure of 71 percent.

Ph.D.'s[a] employed as full-time scientists and engineers at universities and colleges by institutional control: January 1969 and 1974-76

(Percent of total)

Control	Average annual percent change 1969-74	Percent change 1974-75	Percent change 1975-76
Public	7.1	5.0	2.8
Private	2.7	1.4	2.2



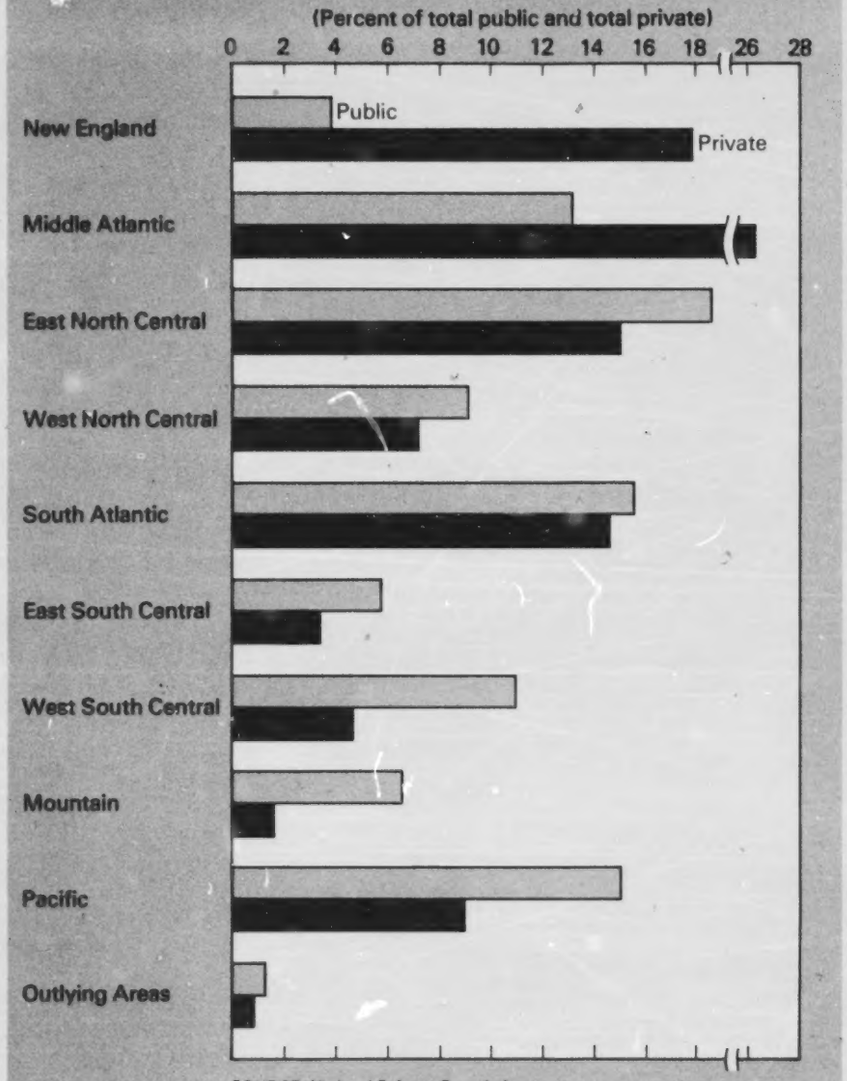
[a]Excludes M.D.'s, D.D.S.'s, Ed.D.'s.
SOURCE: National Science Foundation

Geographic Distribution

The geographic distribution of full-time scientists and engineers for private institutions is much different from that of public institutions. The concentration of private higher education in the Northeastern region of the United States can be seen in the accompanying chart. Private institutions located in the New England and Middle Atlantic divisions accounted for 18 percent and 26 percent, respectively, of all full-timers at U.S. private institutions. These percentages stand in contrast with corresponding figures for public institutions—4 percent and 13 percent, respectively. In three major States—Massachusetts, Connecticut, and New York—total private employment, in absolute terms, was actually higher than total public employment.

Employment at public institutions does not show the degree of geographic concentration evidenced at private institutions. The largest share of employment at public institutions was registered by universities and colleges in the East North Central States, with nearly 19 percent of total public employment. This division, however, also accounted for a sizable share of private employment with 15 percent of the total, ranking it second only to the Middle Atlantic division. The largest relative difference in favor of public employment occurred in the Pacific States which accounted for 15 percent of public employment, but only 9 percent of private employment.

Full-time scientists and engineers employed at universities and colleges, by geographic division and institutional control: January 1976

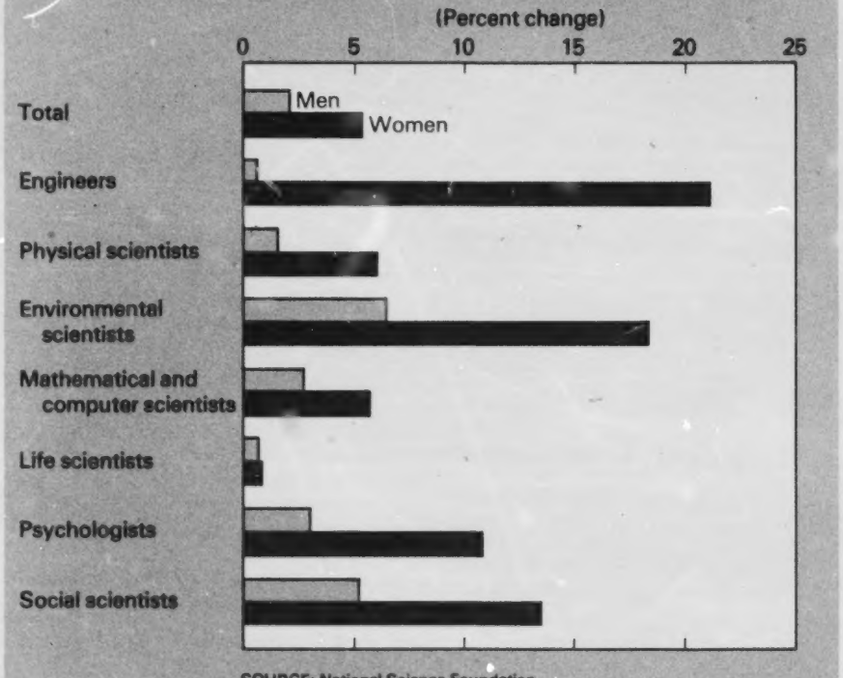


SOURCE: National Science Foundation

The number of women employed full time as scientists and engineers by universities and colleges numbered 35,900 in January 1976, representing the second consecutive annual increase of 5 percent. By contrast, men, who far outnumber women in total employment with 194,600, recorded rate increases of only 2 percent in each of the last 2 years.[4] Despite the higher growth rate of women, there has been little change in their share of the full-time scientist and engineer total—up from 15 percent to 16 percent from 1974 to 1976.

[4] The first year in which sex data were collected for this study was 1974.

Full-time scientists and engineers employed at universities and colleges, by field and sex: January 1975-76



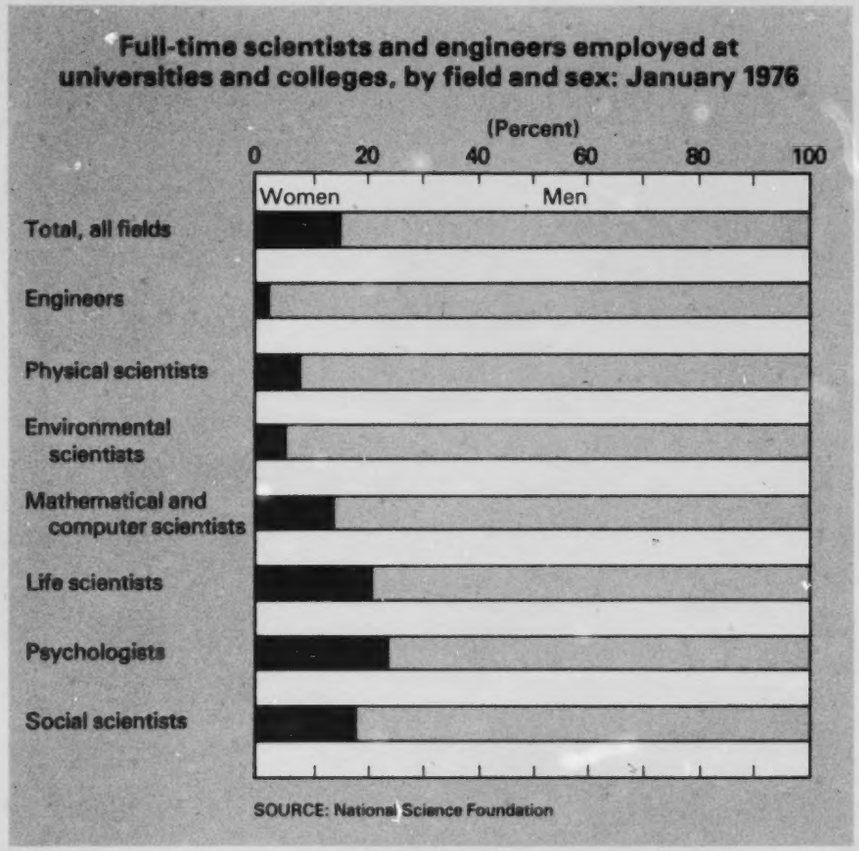
SOURCE: National Science Foundation

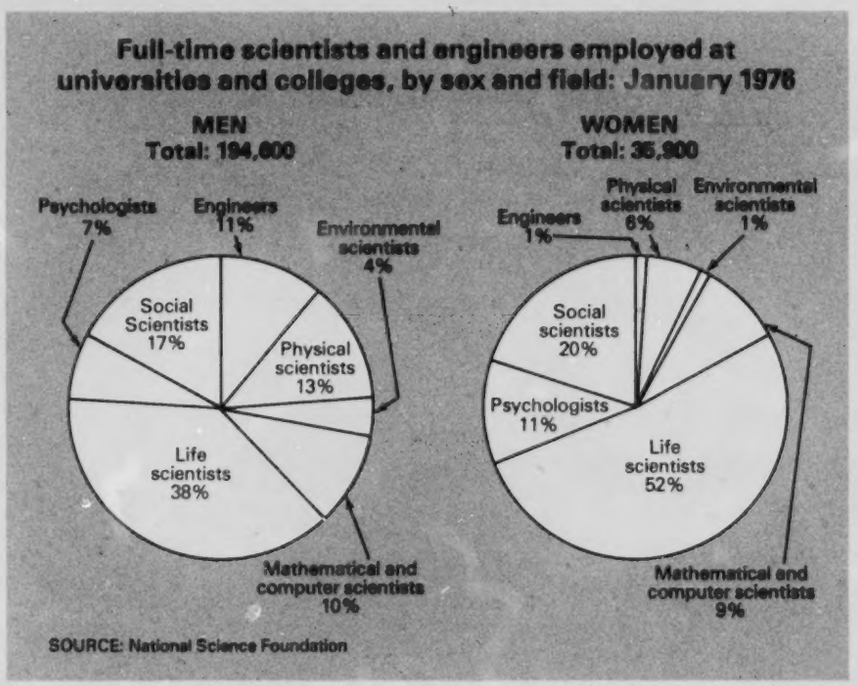
Field of Employment

Between 1975 and 1976, women employment increased at a higher rate than men in every major field. The largest relative increases occurred in engineering, at 21 percent, and in the social sciences and psychology, at 13 percent and 11 percent, respectively. Because of the small number of women employed in universities and colleges as engineers, the increase had little effect on the overall employment pattern in engineering. Gains recorded in the social sciences and psychology, however, did affect the proportion of women in these fields. Women employed as social scientists increased from 16 percent and 17 percent of all social scientists in 1974 and 1975, respectively, to 18 percent in 1976, while those employed as psychologists rose from a 21-percent share to 24 percent in this same period. No change was recorded in women's share of the life sciences total—they accounted for 20 percent in each of the 3 years—or in the physical and environmental sciences total, where they represented 7 percent in each year.

More than one-half of women scientists and engineers continued to be concentrated in the life sciences, compared to 38 percent for men. At the other extreme only 1 percent of women were employed as engineers compared to 11 percent for men. The distribution by field for women has shown a small shift over the last 2 years and has involved three major categories of employment.

The life sciences' share of total female employment declined from 56 percent to 52 percent, while the social sciences and psychology showed increases from 18 percent to 20 percent, and 10 percent to 11 percent, respectively. Among detailed fields medical scientists showed a 2-year decline from 34 percent to 29 percent of the women total. Among social scientists, sociologists increased their share slightly as did "other social scientists." Men, on the other hand, showed virtually no shift in distribution in any of the major categories.



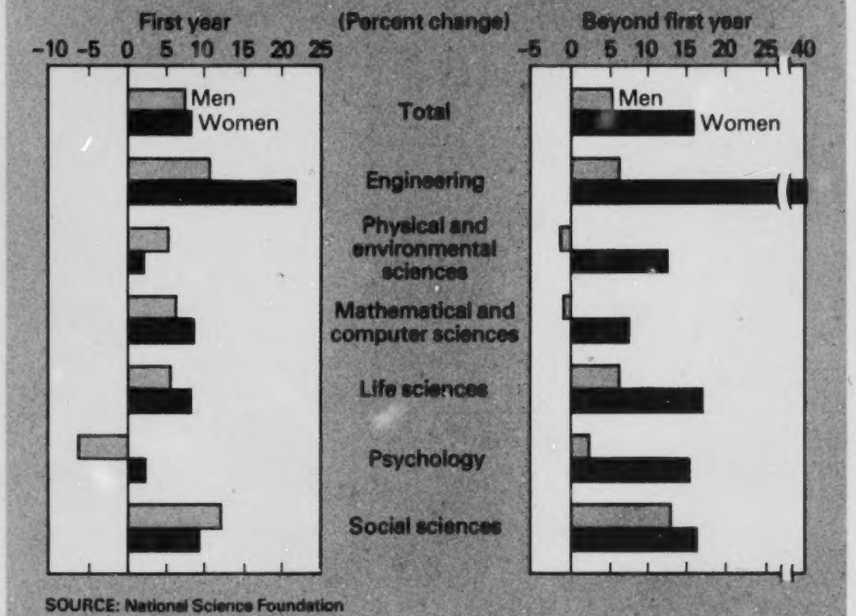


Graduate Students in Science/Engineering

Projecting on the basis of trends in the pool of current graduate S/E students, from which future scientists and engineers will emerge, it is expected that women will continue to expand their share of the employment market. As noted from NSF's Survey of Graduate Science Student Support and Postdoctorals, women have continued to make up an increasing proportion of S/E graduate students. According to the study, ". . .in 1975, there were 52,600 women enrolled full time in graduate science departments, an increase of 13 percent over the 1974 total. This was more than double the 6-percent increase in male full-time graduate science students. . . ."[5] Another indicator of an improved outlook for women (relative to men) can also be found in the pattern of change in outside support to graduate S/E students. Highlights from the above survey point out ". . .the number of women enrolled full time who were primarily supported by the Federal Government increased 10 percent in 1975, while the number of men receiving such support declined by 2 percent. . . ." Women showed significantly higher growth rates for all other forms of outside support and a somewhat lower rate of increase in the number dependent upon self-support.

[5] See National Science Foundation, *Science Resources Studies Highlights*, "Self-Supported Graduate Science Students Increased by 22 percent in 1975" (NSF 76-320) (Washington, D.C. 20550, September 30, 1976).

Full-time graduate enrollment, by sex of student, level of study, and field: 1974-75

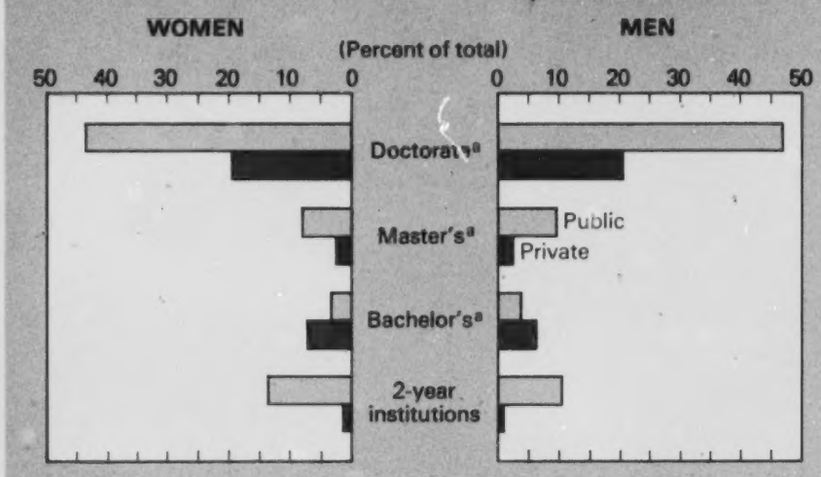


SOURCE: National Science Foundation

Type of Institution

Doctorate-granting institutions employed 131,300 men, or 67 percent of all male scientists and engineers, and 22,900 women, or 64 percent of all female scientists and engineers. The proportions are close for nearly all major groupings of institutions, including their further classification into public and private institutions. The largest difference in employment percentages occurred at public 2-year institutions, which employed 10 percent of male scientists and engineers (19,900) and 14 percent of female scientists and engineers (5,000) in January 1976.

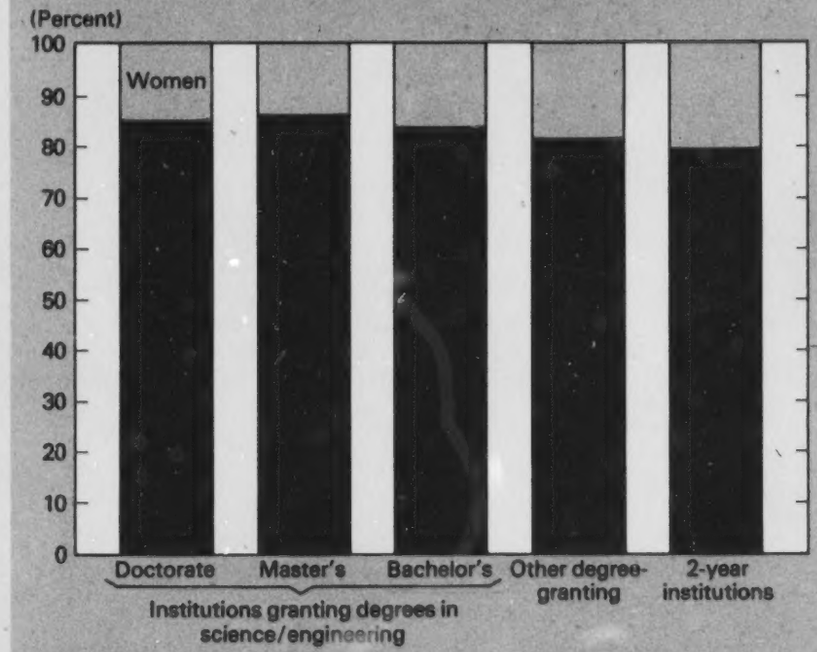
Full-time scientists and engineers employed at universities and colleges, by sex, and type and control of institution: January 1976



[a]Institutions granting degrees in science and engineering.
Note: Other degree-granting institutions accounted for less than 0.5 percent of all full-time scientists and engineers.
SOURCE: National Science Foundation

The proportion of women employed was somewhat higher at undergraduate institutions than at graduate institutions, and was highest among 2-year institutions. The range went from 14 percent at master's granting institutions up to 20 percent at 2-year institutions. Doctorate-, master's-, and bachelor's-granting institutions each showed an increase in the ratio of women employed over the 1974-76 period. Two-year institutions, however, showed an overall decline from 22 percent to 20 percent. The reduction in the relative level of women was traceable to public 2-year institutions, which showed this same decline. Private 2-year institutions actually showed an increase in the proportion of women employed from 26 percent to 28 percent. Because scientists and engineers employed at public 2-year institutions outnumber those at private 2-year colleges by 16 to 1, the reduction at public 2-year institutions virtually negated the increase at private 2-year colleges.

Full-time scientists and engineers employed at universities and colleges, by type of institution and sex: January 1976

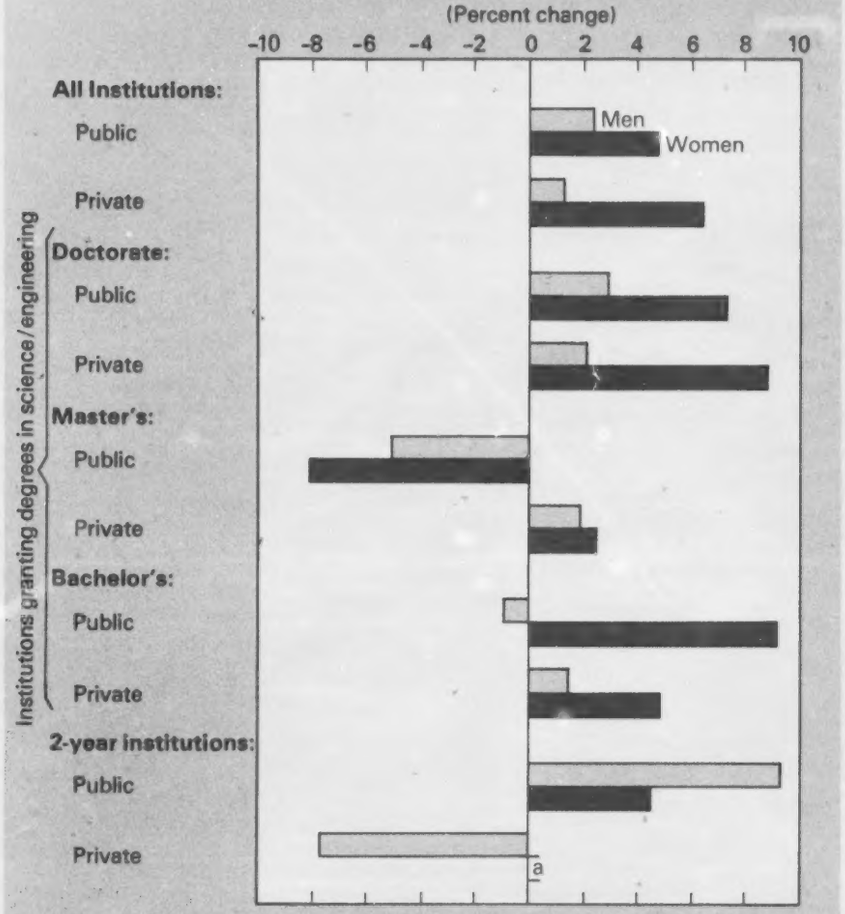


SOURCE: National Science Foundation

The 1975-76 growth rate in women employment was well above the increase in male employment at both public and private institutions. Public doctorate-granting institutions, for example, showed a 7-percent gain in women employment compared to a 3-percent increase in male employment, while private doctorate-granting institutions showed a 9-percent jump in female employment, compared to a 2-percent rise in male employment. Moreover, doctorate-granting institutions accounted for 92 percent of the 1,800 gain in female employment from 1975 to 1976.

Reductions in both male and female employment occurred at public master's institutions, which showed declines of 5 percent for male scientists and engineers and 8 percent for female scientists and engineers. The 1976 employment totals for men and women at these institutions were 18,400 and 2,800, respectively.

Full-time scientists and engineers employed at universities and colleges, by type and control of institution, and sex: January 1975-76

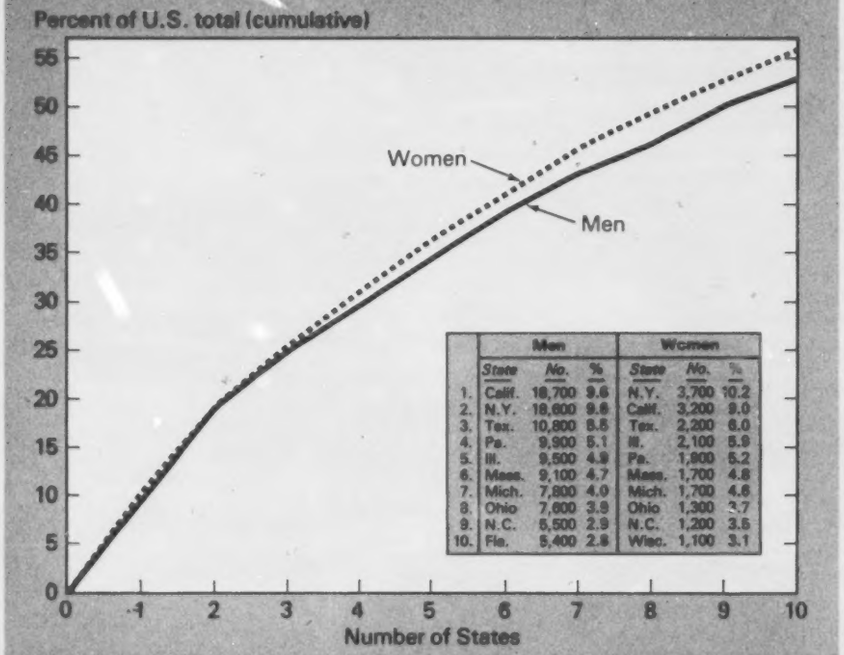


[a]No change.
SOURCE: National Science Foundation

Geographic Distribution

The 10 States leading in terms of male employment each employed more than 5,000 men—from 5,400 (2.8 percent of male full-timers) in Florida to 18,700 (9.6 percent of male full-timers) in California. The 10 States leading in female employment were the same as those for men with the exception of Wisconsin, which replaced Florida in the 10th position. Each of them employed more than 1,000 women—from 1,100 (3.1 percent) in Wisconsin to 3,700 (10.2 percent) in New York. The geographic concentration of women closely paralleled that of men, but was slightly greater overall (56 percent compared to 53 percent for 10 States).

Full-time scientists and engineers employed at universities and colleges in 10 leading States, by sex: January 1976



	Men			Women		
	State	No.	%	State	No.	%
1.	Calif.	18,700	9.6	N.Y.	3,700	10.2
2.	N.Y.	18,600	9.6	Calif.	3,200	9.0
3.	Tex.	10,800	5.5	Tex.	2,200	6.0
4.	Pa.	9,900	5.1	Ill.	2,100	5.9
5.	Ill.	9,500	4.9	Pa.	1,900	5.2
6.	Mass.	9,100	4.7	Mass.	1,700	4.8
7.	Mich.	7,800	4.0	Mich.	1,700	4.6
8.	Ohio	7,600	3.9	Ohio	1,300	3.7
9.	N.C.	5,500	2.9	N.C.	1,200	3.5
10.	Fla.	5,400	2.8	Wisc.	1,100	3.1

SOURCE: National Science Foundation

Institutional Distribution

A total of 75,400 full-time scientists and engineers (or 33 percent of total full-timers employed by all institutions) were employed at 50 doctorate-granting institutions. The degree of concentration of major categories of scientists and engineers at the 50 universities varied considerably. These 50 institutions (comprising 2 percent of all institutions in the survey) employed from 18 percent of all psychologists and mathematical and computer scientists up to 44 percent of all life scientists.

Among the 50 doctorate-granting universities leading in employment of full-time scientists and engineers, the University of Michigan ranked first in the number of women employed in 1976. The proportion of women varied from a high of nearly 30 percent at Yale University to only 3 percent or 4 percent at Texas A&M University, Virginia Polytechnic Institute, and Georgia Institute of Technology. It should be noted that at any given institution, program emphasis greatly affects the employment pattern of women. For example, Georgia Institute of Technology, with its heavy emphasis on engineering (a field in which women average only 2 percent of the national total) shows a relatively small proportion of women employed. Yale's high proportion of women, on the other hand, can be explained primarily on the basis that nearly three-fourths of its full-time employment were reported in the life sciences, the area of employment showing, by far, the largest total number of women employed.

FULL-TIME SCIENTISTS AND ENGINEERS AT FIFTY LEADING DOCTORATE-GRANTING INSTITUTIONS IN EMPLOYMENT OF SCIENTISTS AND ENGINEERS, BY EMPLOYMENT CATEGORY AND SEX: JANUARY 1976

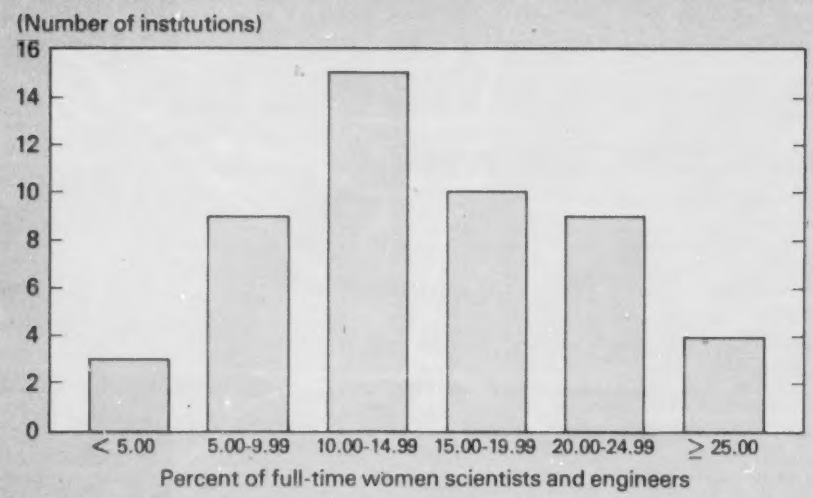
INSTITUTIONAL RANKING	TOTAL, ALL CATEGORIES		ENGINEERING		PHYSICAL SCIENCES		ENVIRON-MENTAL SCIENCES		MATHE-MATICAL SCIENCES		LIFE SCIENCES		PSYCHOLOGY		SOCIAL SCIENCES	
	GRAND TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN
TOTAL, ALL DOCTORATE-GRANTING INSTITUTIONS	154208	22940	16864	372	15498	944	4764	243	10393	1050	77948	15018	7479	1617	21262	3696
1 HARVARD UNIVERSITY	3090	429	50	2	235	15	34	3	58	7	2512	377	43	8	158	17
2 UNIVERSITY OF MICHIGAN	3041	732	338	21	258	35	96	5	102	7	1760	535	150	50	337	79
3 UNIVERSITY OF MINNESOTA	2801	456	183	0	160	10	64	4	140	12	1625	307	118	18	511	105
4 UNIV OF WISCONSIN-MADISON	2658	624	250	13	199	14	126	14	112	3	1377	394	223	77	371	109
5 OHIO STATE UNIVERSITY	2381	491	273	5	165	6	53	1	113	8	1484	438	47	3	246	30
6 UNIVERSITY OF WASHINGTON	2146	564	187	4	118	4	183	9	69	4	1411	513	44	11	134	19
7 UNIV ILLINOIS URBANA	2041	423	344	72	280	45	55	13	265	56	607	133	142	27	348	77
8 CORNELL UNIVERSITY	2020	325	255	5	125	4	44	2	40	1	1119	185	26	5	411	123
9 UNIVERSITY OF FLORIDA	1972	198	217	3	160	7	72	3	75	6	1136	111	63	18	249	50
10 JOHNS HOPKINS UNIVERSITY	1929	288	54	1	92	6	31	1	59	9	1521	228	30	7	142	36
TOTAL 1ST 10 INSTS.	24079	4530	2151	126	1792	146	758	55	1033	113	14552	3221	886	224	2907	645
11 PENNSYLVANIA STATE UNIV	1867	155	449	5	197	11	89	2	175	19	681	77	77	22	199	19
12 MASS INST OF TECHNOLOGY	1807	234	678	42	387	34	86	7	132	9	320	116	31	13	173	13
13 TEXAS A & M UNIVERSITY	1757	57	290	3	89	1	61	2	72	5	874	11	34	4	337	31
14 YALE UNIVERSITY	1754	519	60	1	129	8	38	5	53	4	1281	457	41	22	152	22
15 STANFORD UNIVERSITY	1717	305	235	6	145	4	37	0	65	6	1103	259	28	10	104	20
16 WASHINGTON UNIV ST LOUIS	1674	285	63	0	64	4	1	0	29	0	1426	269	26	3	65	9
17 UNIV OF TEXAS AT AUSTIN	1603	307	257	21	359	25	109	15	134	18	199	63	148	50	397	115
18 N C STATE UNIV AT RALEIGH	1600	350	196	1	61	3	16	0	110	6	1008	307	20	4	189	29
19 UNIVERSITY OF PITTSBURGH	1574	436	123	2	133	8	17	0	112	15	871	323	112	48	206	40
20 PURDUE UNIV ALL CAMPUSES	1561	138	334	3	208	11	24	1	154	15	561	77	85	18	195	13
TOTAL 1ST 20 INSTS.	40993	7316	4836	210	3564	255	1236	87	2069	210	22876	5180	1488	418	4924	956
21 MICHIGAN STATE UNIVERSITY	1555	191	118	0	173	5	35	0	129	11	714	119	115	22	271	34
22 U OF CAL LOS ANGELES	1518	195	154	3	163	7	51	3	69	5	781	145	65	10	235	22
23 RUTGERS THE STATE UNIV	1433	288	91	1	153	13	49	1	160	30	415	88	133	33	432	122
24 U OF CAL BERKELEY	1368	165	296	8	197	13	18	0	84	6	467	88	45	10	263	40
25 UNIVERSITY OF CHICAGO	1355	247	29	0	184	9	39	3	70	5	847	201	46	15	140	14
26 CASE WESTERN RESERVE UNIV	1295	180	111	2	93	3	13	0	36	2	913	159	20	3	109	11
27 COLUMBIA UNIV MAIN DIV	1289	250	101	2	143	11	86	5	41	2	770	207	32	11	116	12
28 UNIVERSITY OF ARIZONA	1284	114	138	0	221	7	110	5	60	4	519	67	74	8	162	23
29 NEW YORK UNIVERSITY	1284	216	5	0	95	3	2	0	92	4	788	167	98	25	204	17
30 UNIV OF STHRN CALIFORNIA	1222	195	122	2	71	5	16	0	71	5	697	132	42	4	203	47
TOTAL 1ST 30 INSTS.	54596	9357	5999	228	5057	331	1655	104	2881	284	29787	6553	2158	559	7059	1298
31 UNIVERSITY OF KANSAS	1214	261	86	2	87	5	51	6	71	5	567	151	107	25	245	67
32 UNIV OF MD COLLEGE PARK	1214	203	154	5	272	20	12	3	131	13	366	68	77	56	202	38
33 UNIVERSITY OF IOWA	1213	144	65	1	74	0	13	0	62	5	816	118	30	5	153	15
34 UNIVERSITY OF COLORADO	1208	127	133	1	203	2	42	0	81	9	536	88	71	11	142	16
35 DUKE UNIVERSITY	1183	250	44	0	66	1	17	2	33	2	897	234	26	2	100	9
36 UNIV OF MISSOURI COLUMBIA	1180	109	121	0	71	4	19	0	49	0	741	88	35	5	144	12
37 U OF CAL DAVIS	1110	101	81	1	69	1	24	0	39	3	710	65	22	1	155	30
38 IOWA ST U OF SCI & TECH	1104	101	310	3	78	4	47	2	97	4	377	37	29	5	166	46
39 UNIV OF NC AT CHAPEL HILL	1094	134	0	0	127	6	50	3	79	9	673	93	49	11	116	12
40 TEMPLE UNIVERSITY	1088	230	27	1	70	8	0	0	74	8	588	132	117	34	212	47
TOTAL 1ST 40 INSTS.	66204	11017	7020	242	6174	382	1940	120	3597	342	36058	7627	2721	714	8694	1590
41 UNIVERSITY OF GEORGIA	995	84	24	0	95	6	33	3	64	7	532	41	93	15	154	12
42 WEST VIRGINIA UNIVERSITY	986	138	90	2	35	1	40	0	47	11	667	111	20	4	87	9
43 OREGON STATE UNIVERSITY	979	148	130	1	93	1	102	5	72	7	451	63	21	11	110	20
44 U OF CAL SAN FRANCISCO	914	233	0	0	0	0	0	0	2	0	911	232	1	1	0	0
45 UNIVERSITY OF HAWAII	908	131	78	2	71	5	68	2	43	2	376	74	42	6	230	40
46 VIRGINIA POLYTECHNIC INST	902	40	237	2	70	3	28	0	100	10	343	12	20	2	104	11
47 UNIV OF KENTUCKY ALL CAM	902	59	87	0	42	2	12	1	65	2	547	51	36	1	113	2
48 GEORGIA INSTITUTE OF TECH	897	38	506	11	159	4	10	0	84	6	22	4	12	1	104	12
49 U OF CAL SAN DIEGO	880	85	48	0	163	6	78	7	35	3	461	51	22	3	73	15
50 UNIVERSITY OF CONNECTICUT	868	107	82	1	73	7	22	1	44	4	461	72	59	5	127	17
TOTAL 1ST 50 INSTS.	75435	12040	8302	261	6975	417	2333	139	4153	394	40829	8338	3047	763	9796	1728
TOTAL ALL OTHER INSTS.	78773	10900	8562	111	8523	527	2431	104	6240	656	37119	6680	4432	854	11466	1968

NOTE: TABLE DOES NOT INCLUDE ANY LEADING INSTITUTION THAT (1) REQUIRED NATIONAL SCIENCE FOUNDATION ESTIMATES, OR (2) REQUESTED THAT ITS DATA BE HELD CONFIDENTIAL.

SOURCE: NATIONAL SCIENCE FOUNDATION.

Among these 50 universities the median employment level for women was 14 percent, but one-half of the institutions showed levels outside the 10- to 20-percent range. Three institutions posted levels beneath 5 percent, while at the other end of the scale, four universities registered proportions in excess of 25 percent.

Distribution of 50 universities and colleges leading in employment of full-time scientists and engineers by proportion of women employed: January 1976

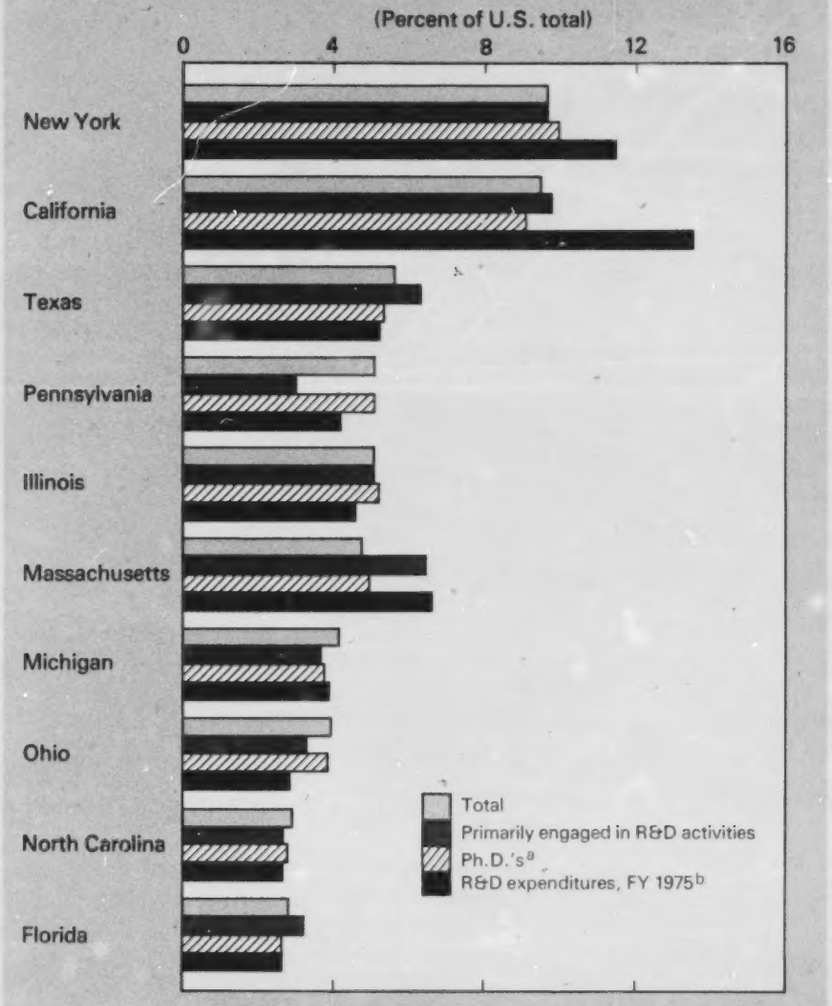


SOURCE: National Science Foundation

Geographic Concentration

The 10 States leading in employment of full-time scientists and engineers accounted for 53 percent of the total. The distribution of total (teaching, R&D, and other) full-time scientists and engineers compared well with the distribution of R&D scientists and engineers, Ph.D.-holders, and with academic R&D expenditures among these 10 States. Overall, the 10 States represented 53 percent of total scientists and engineers, 53 percent of scientists and engineers primarily engaged in research and development, 52 percent of Ph.D.-holders and 57 percent of academic R&D expenditures. The somewhat higher level of R&D expenditures can be traced principally to the relatively high proportions of R&D expenditures in New York and California, the two States leading in each of the four variables. The share of total R&D expenditures accounted for by each of these two States was somewhat higher than corresponding shares of personnel employed.

Full-time scientists and engineers and R&D expenditures at universities and colleges in 10 States leading in full-time employment: January 1976



[a]Excludes M.D.'s, D.D.S.'s, and Ed.D.'s.
[b]Data based on NSF's survey of scientific and engineering expenditures at universities and colleges, FY 1975.
SOURCE: National Science Foundation

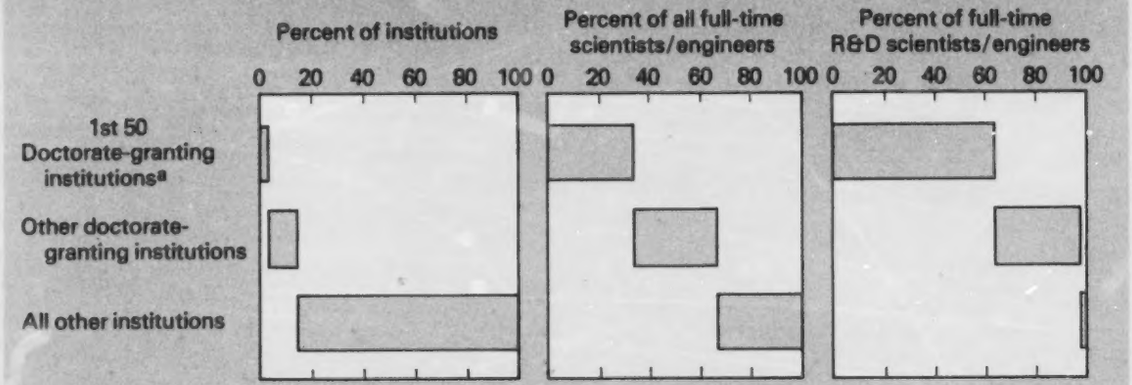
Institutional Concentration

Full-time scientists and engineers primarily engaged in R&D activities are concentrated much more heavily than all scientists and engineers. Fifty universities leading in full-time employment of scientists and engineers, representing 2 percent of all institutions surveyed, accounted for one-third of all full-time scientists and engineers, but nearly two-thirds of all full-time scientists and engineers primarily engaged in R&D activities. Other doctorate-granting institutions accounted for another one-third of all full-timers and nearly all of the remaining scientists and engineers primarily engaged in research and development. Only 2 percent of the researchers are employed at institutions classified below the doctorate-granting level.

Another indication of the degree of concentration of scientists and engineers engaged primarily in research and development, even among doctorate-granting institutions, is the fact that 29, or 10 percent of them each employed more than 400 scientists and engineers primarily engaged in research and development and accounted for slightly less than one-half of all those primarily engaged in research and development employed by all academic institutions.

As might be expected, the degree of concentration of scientists and engineers primarily engaged in research and development follows closely the concentration of R&D expenditures at academic institutions. The slope of the line for 100 universities in R&D employment follows very closely the path for the leading 100 universities in R&D expenditures. Not only is the slope of the line very similar, but the levels are quite close also. For example, the first 50 universities in R&D employment and R&D expenditures accounted for 63 percent and 62 percent of their respective totals for all institutions.

Concentration of scientists and engineers employed at universities and colleges by institutional grouping: January 1976


Percent of institutions
Percent of all full-time scientists/engineers
Percent of full-time R&D scientists/engineers
0 20 40 60 80 100
1st 50 Doctorate-granting institutions[a]
Other doctorate-granting institutions
All other institutions

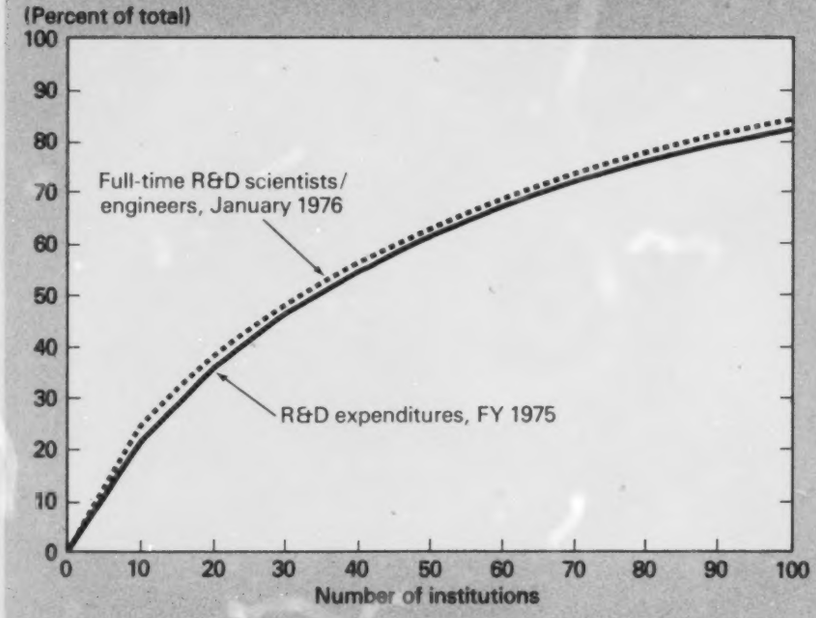
[a]Institutions ranked by full-time employment of scientists and engineers.
SOURCE: National Science Foundation

50 Universities and colleges leading in the employment of full-time R&D scientists and engineers primarily engaged in R&D activities compared with all full-time scientists and engineers: January 1976

Institutions Ranked on Number of R&D Scientists and Engineers	R&D Scientists and Engineers	All Scientists and Engineers
TOTAL, ALL INSTITUTIONS	44549	230539
1 JOHNS HOPKINS UNIVERSITY	1547	1929
2 UNIV OF WISCONSIN-MADISON	1366	2658
3 UNIVERSITY OF MICHIGAN	1161	3041
4 STANFORD UNIVERSITY	1151	1717
5 UNIVERSITY OF WASHINGTON	1080	2146
6 YALE UNIVERSITY	954	1754
7 WASHINGTON UNIVERSITY	919	1674
8 HARVARD UNIVERSITY	820	3090
9 UNIV ILLINOIS URBANA	799	2041
10 CORNELL UNIVERSITY	764	2020
TOTAL 1ST 10 INSTS.	10561	22070
11 UNIVERSITY OF FLORIDA	726	1972
12 UNIVERSITY OF ARIZONA	666	1284
13 UNIVERSITY OF CHICAGO	660	1355
14 DUKE UNIVERSITY	609	1183
15 CASE WESTERN RESERVE UNIV	586	1295
16 U TEX CAN CTR MDA H & TI	566	664
17 UNIV OF TEXAS AT AUSTIN	562	1603
18 U OF CAL BERKELEY	528	1368
19 NEW YORK UNIVERSITY	528	1284
20 BAYLOR COLLEGE OF MED	524	661
TOTAL 1ST 20 INSTS.	16516	34739
21 UNIVERSITY OF PITTSBURGH	490	1574
22 OREGON STATE UNIVERSITY	469	979
23 UNIVERSITY OF IOWA	443	1213
24 UNIVERSITY OF ROCHESTER	442	804
25 U OF CAL SAN DIEGO	437	880
26 UNIVERSITY OF GEORGIA	417	995
27 GEORGIA INSTITUTE OF TECH	408	897
28 COLUMBIA UNIV MAIN DIV	408	1289
29 CALIFORNIA INST OF TECH	406	647
30 RUTGERS THE STATE UNIV	388	1433
TOTAL 1ST 30 INSTS.	20824	45450
31 OHIO STATE UNIVERSITY	386	2381
32 UNIV OF MISSOURI COLUMBIA	386	1180
33 CUNY MT SINAI SCH OF MED	381	618
34 U OF CAL DAVIS	376	1110
35 UNIVERSITY OF KANSAS	366	1214
36 UNIVERSITY OF MIAMI	345	771
37 UNIV OF STHRN CALIFORNIA	340	1222
38 ROCKEFELLER UNIVERSITY	331	331
39 VA POLYTECH INST & ST U	320	902
40 UNIV ALABAMA BIRMINGHAM	315	805
TOTAL 1ST 40 INSTS.	24370	55984
41 U OF CAL SAN FRANCISCO	293	914
42 U OF CAL LOS ANGELES	289	1518
43 IOWA ST U OF SCI & TECH	289	1104
44 MICHIGAN STATE UNIVERSITY	287	1555
45 NORTHWESTERN UNIVERSITY	286	866
46 MISSISSIPPI STATE UNIV	283	526
47 NEW YORK MEDICAL COLLEGE	283	435
48 UNIV OF KENTUCKY ALL CAM	282	902
49 U TEX HLTH SCI CTR DALLAS	278	669
50 VANDERBILT UNIVERSITY	277	621
TOTAL 1ST 50 INSTS.	27217	65094

NOTE: Table does not include any leading institution that (1) required National Science Foundation estimates, or (2) requested that its data be held confidential.
SOURCE: National Science Foundation

Scientists and engineers primarily engaged in R&D activities and R&D expenditures at 100 leading universities and colleges[a]

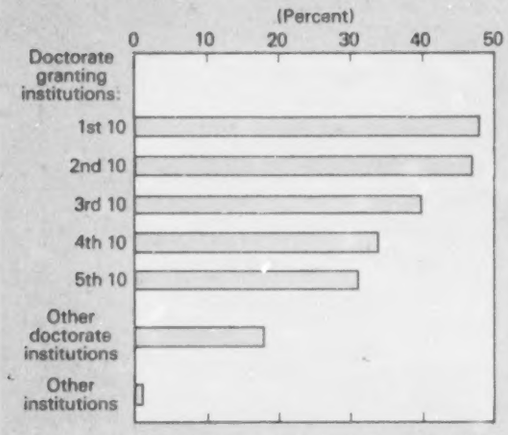


[a]Institutions were ranked separately on each variable.
SOURCE: National Science Foundation

R&D Intensiveness

Nearly one-half of the full-time scientists and engineers working at the 20 leading universities are employed primarily on research activities. The proportion of full-timers employed primarily on R&D activities decreased substantially among other groups of institutions. Doctorate-granting institutions below the first 50 in R&D employment reported less than one-fifth of their full-time personnel as primarily engaged in research. In institutions below the doctorate level, the proportion of researchers to total full-time scientists and engineers was only 1 percent.

Scientists and engineers primarily engaged in R&D activities as a percent of total full-time scientists and engineers at leading groups of universities and colleges: January 1976



Note: Institutions grouped according to number of R&D scientists/engineers employed
SOURCE: National Science Foundation

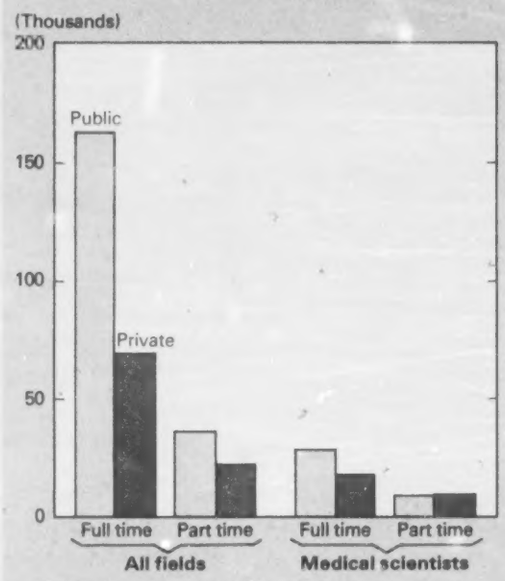
Part-time Scientists and Engineers

In 1976 among S/E degree-granting institutions the proportion of part-time scientists and engineers fell within a narrow range of 17 percent to 20 percent. Among "other" institutions (consisting almost entirely of 2-year institutions) the proportion of part-timers was 35 percent.

Since 1974 there has been a sizable increase in the proportion of part-time scientists and engineers at 2-year institutions. The increase from 27 percent in 1974 to 35 percent is attributable to the rapid expansion in the number of part-timers at public 2-year institutions, from 8,400 in 1974 to 13,300 in 1976. The number of part-timers at private 2-year institutions showed a reduction, from 700 to 600 during this period.

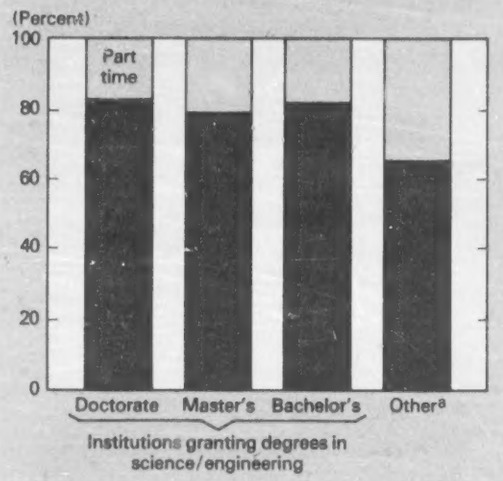
Part-time scientists and engineers comprised 24 percent of all scientists and engineers employed at private institutions, compared to 18 percent at public institutions. The greater proportion of part-time personnel at private institutions is primarily attributable to heavier reliance on part-time medical scientists at private universities and colleges. In 1976 they numbered 8,600, and constituted 39 percent of all part-timers at private institutions. This compares with 8,400 part-time medical scientists at public institutions, or 23 percent of total part-timers at public institutions. The part-time medical scientist category is the only one in which private institutions employed more professional personnel than public institutions.

Comparison of total scientists and engineers with medical scientists employed at universities and colleges, by employment status and institutional control: January 1976



SOURCE: National Science Foundation

Scientists and engineers employed at universities and colleges, by type of institution and employment status: January 1976



[a]Consists almost entirely of 2-year institutions.
SOURCE: National Science Foundation

Section 2. EMPLOYMENT OF TECHNICIANS

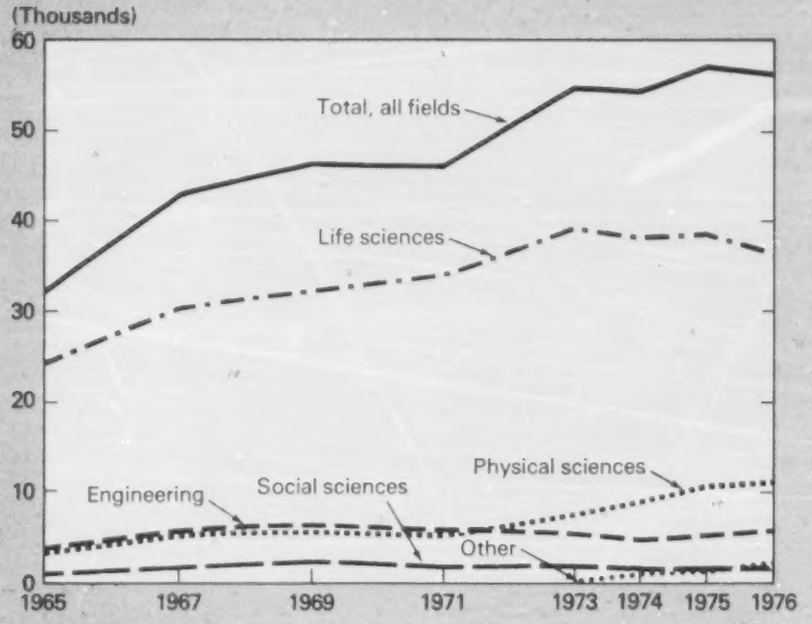
Technicians, as defined by this survey, include all persons employed in positions involving technical work at a level requiring knowledge in any of the S/E fields similar to that obtained through formal post high school training (less than a bachelor's degree) acquired at technical institutes and junior colleges or through equivalent on-the-job training. All personnel performing the above functions are included even if they hold a bachelor's or higher degree. Included as technicians are laboratory assistants, physical science aides, engineering aides, statistical aides, draftsmen, and computer programmers. Excluded are graduate students and craftsmen such as electricians, etc.

Trends

There were 56,400 technicians reported in universities and colleges in 1976, a 2-percent decline from the previous year's total after a 6-percent increase from 1974 to 1975. The 1975-76 decrease, the third annual decline since 1965, was largely due to a 4-percent decline in those primarily engaged in non-R&D activities. R&D technicians also declined but by less than one-half of 1 percent in 1976. The decline in non-R&D technicians has at least temporarily halted the shift in functional distribution away from research and development. In 1965, for example, R&D technicians comprised 72 percent of the total, but in 1975 the proportion was down to 64 percent. In 1976 the R&D proportion was up 1 point to 65 percent.

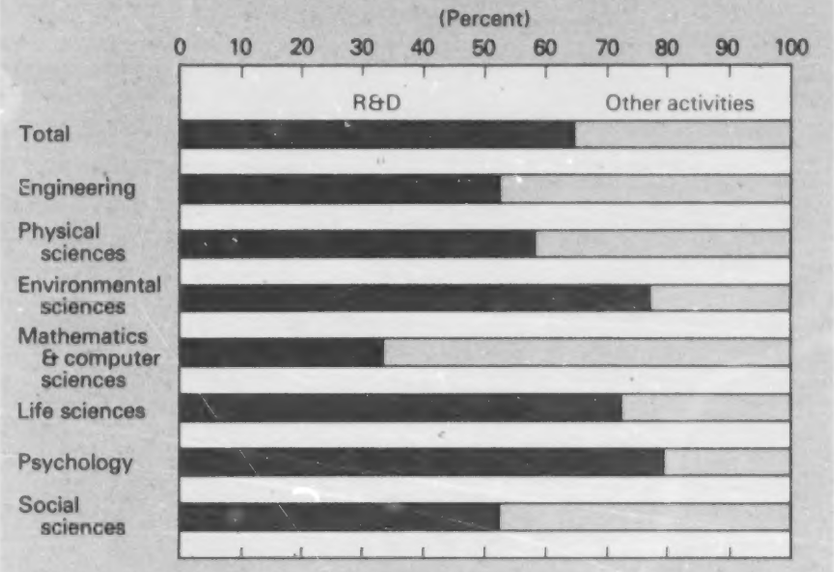
The ratio of technicians to full-time-equivalent (FTE) scientists and engineers in 1976 was 22 per 100, one point below the 1974 and 1975 ratios. By type of activity, R&D technicians represented 68 per 100 FTE research scientists and engineers compared to a ratio of 76 per 100 FTE scientists and engineers in 1974. Those technicians primarily engaged in non-R&D activities represented about 10 per 100 FTE's during the period 1974-76.

Technicians employed at universities and colleges, by field: January 1965-76



SOURCE: National Science Foundation

Technicians employed at universities and colleges, by field and activity: January 1976



SOURCE: National Science Foundation

Field of Employment

Life science technicians totaled 36,600 and accounted for 65 percent of all technicians in 1976. This total represented a decline of 6 percent since 1975 and followed a 3-percent reduction from 1974 to 1975. The decline of 2,200 life science technicians from 1975 to 1976 was fairly evenly spread between research and development and other activities and was almost solely responsible for the overall decline in the employment of technicians in 1976. Within all science areas, except the mathematical and computer sciences, most technicians were primarily employed in research and development. It should be noted, however, that computer programmers accounted for a significant number of mathematical and computer science technicians primarily employed in other activities.

The ratio of technicians to all full-time scientists and engineers was 24 per 100 in 1976. Within the life sciences, the ratio was 39 per 100. Engineering ranked a distant second with a ratio of 25 per 100. Psychology and the social sciences showed the lowest ratios of technicians to full-time scientists and engineers with 11 per 100 and 3 per 100, respectively.

Type of Institution

In 1976 doctorate-granting institutions, accounting for 67 percent of all full-time scientists and engineers, employed 90 percent of all technicians in universities and colleges and 98 percent of those primarily involved in research and development. Master's institutions employed only 3 percent of all technicians, bachelor's institutions employed 2 percent, and 2-year institutions employed the remainder.

Technicians employed at universities and colleges, by field of employment and type of institution: January 1976

Field of employment	Total	Institutions granting degrees in science/engineering			Other institutions
		Doctorate	Master's	Bachelor's	
Total, all fields	56,400	51,100	1,900	1,300	2,200
Engineering	5,700	4,500	300	300	600
Physical sciences	5,200	4,200	400	300	300
Environmental sciences	1,800	1,600	100	(1)	(1)
Mathematical and computer sciences	4,300	3,000	400	300	600
Life sciences	36,600	35,100	500	300	600
Psychology	1,800	1,600	100	(1)	(1)
Social sciences	1,100	1,000	(1)	100	(1)

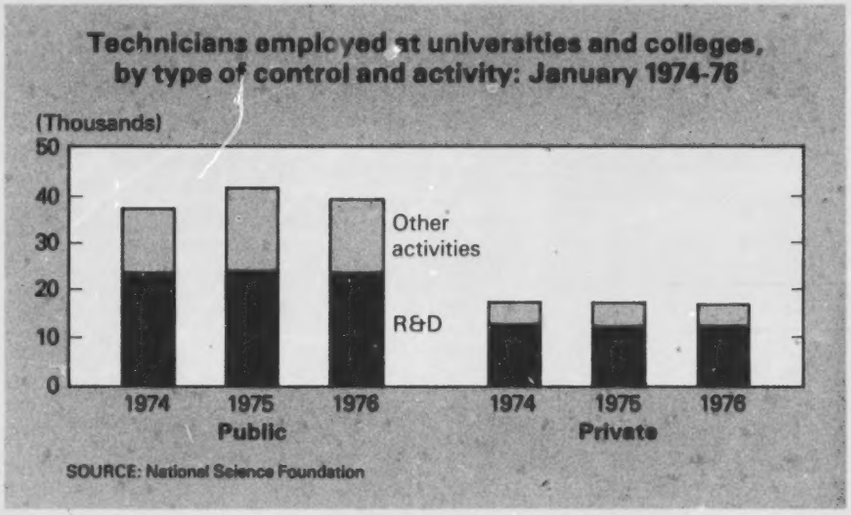
[1] Less than 50.
SOURCE: National Science Foundation

The ratio of technicians to full-time scientists and engineers was significantly greater at doctorate-level institutions than at other types of institutions. At doctorate-level institutions, the ratio of technicians to full-time scientists and engineers was 33 per 100, while at master's-granting institutions, bachelor's institutions, and 2-year institutions, the ratios were 7 per 100, 6 per 100, and 8 per 100, respectively. Almost 70 percent of the technicians in doctorate-granting institutions were in the life sciences, representing the only instance that there was a majority of technicians in a particular field of science.

Institutional Control

Publicly controlled institutions employed 39,300 technicians in 1976 compared to 17,100 technicians at private institutions. In 1976 public institutions accounted for 70 percent of all technicians, the same level as in 1975. Employment of technicians at public institutions declined by 2 percent from 1975 to 1976 after an 8-percent rise between 1974 and 1975. Within private institutions, employment of technicians declined a total of 1 percent over the 1974-76 period.

In 1976 R&D technicians comprised 61 percent of all technicians at publicly controlled institutions and 74 percent at private institutions. By contrast, full-time R&D scientists and engineers accounted for only 17 percent of all full-time scientists and engineers in public institutions and 26 percent in private universities and colleges.



Part II
FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS

Federally Funded Research and Development Centers (FFRDC's) are R&D-performing organizations exclusively or substantially financed by the Federal Government to accomplish either a specific R&D objective of the sponsoring agency or to provide major facilities at universities for research and instruction. FFRDC's are administered on a contractual basis by universities and university consortia, independent nonprofit institutions, and industrial firms. This section is limited to data on the manpower characteristics of the 21 FFRDC's administered by universities and university consortia. Data presented here are excluded from the data for universities and colleges shown in part 1 of this report.

Though they perform R&D work on direct request of, or under a broad charter from sponsoring Federal agencies, the FFRDC's are separate operational units and are independent entities in regard to their R&D work. Most FFRDC's are located in close proximity of their parent institutions. Staffs normally are separate from those of the university, but in some cases, staff members may hold faculty appointments with the associated university.

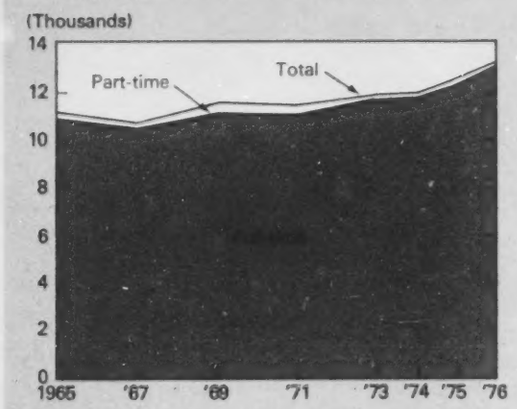
Section 1. EMPLOYMENT OF SCIENTISTS AND ENGINEERS

Trends

There were 13,300 scientists and engineers employed in FFRDC's in January 1976, a 6-percent increase over the 12,500 reported in 1975. By comparison, the 1974-75 rate of increase was 4 percent. Between 1971 and 1974, the average annual increase was only 2 percent and for the 1965-71 period, the rate was less than one-half of 1 percent. The figures for the earlier years, however, include organizations which have subsequently ceased operation or are no longer classified as FFRDC's.

Throughout the 11-year survey period, nearly all scientists and engineers at FFRDC's have been employed in research and development on a full-time basis. The proportion of full-time scientists and engineers at FFRDC's has ranged from 97 percent to 99 percent throughout the 1965-76 period. The proportion of scientists and engineers primarily employed in research and development has also ranged from 97 percent to 99 percent over the same period. By comparison, within universities and colleges over the same 11-year period, approximately four-fifths of the scientists and engineers were employed on a full-time basis, but only about one-fifth of the scientists and engineers were primarily involved in R&D activities.

Scientists and engineers employed at university-administered FFRDC's[a] by employment status: January 1965-76



[a]Federally Funded Research and Development Centers.
SOURCE: National Science Foundation

Field of Employment

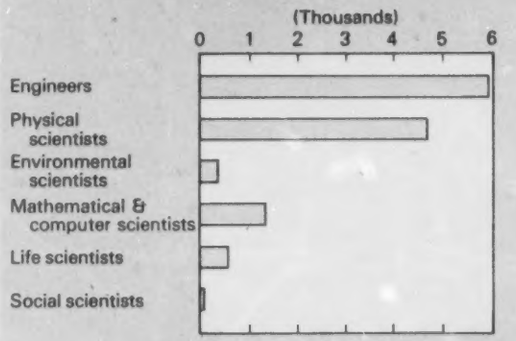
In 1976, as in 1975, over four-fifths of all full-time scientists and engineers employed in university-administered FFRDC's were working in either engineering (46 percent) or the physical sciences (36 percent). By contrast, slightly over one-fifth of all full-time scientists and engineers at universities and colleges were employed in either engineering or the physical sciences in 1976.

Only 5 percent and 1 percent of the FFRDC full-time total were life scientists and social scientists, respectively. At universities and colleges, on the other hand, about 40 percent of all full-time scientists and engineers were employed in the life sciences and 18 percent were in the social sciences.

The large concentration of engineers and physical scientists employed at FFRDC's can be attributed to the nature of the principal R&D activities of their sponsoring agencies. Thus, at FFRDC's sponsored by the Energy Research and Development Administration (ERDA), for example, 46 percent of all full-time scientists and engineers were in the physical sciences and 36 percent were in engineering, the same proportions of S/E personnel in those fields for all FFRDC's. Almost two-thirds of all scientists and engineers employed at FFRDC's sponsored by the Department of Defense (DOD) and the National Aeronautics and Space Administration (NASA) were engineers.

The number of environmental scientists at FFRDC's nearly doubled between 1975 and 1976 while life scientists increased in number by 29 percent, although both continued to account for small percentages of all full-timers. Employment in the other fields increased at rates close to the average with the exception of the number of psychologists, which remained unchanged, and social scientists, which declined. New earth science programs at the Argonne National Laboratory and atmospheric science programs at the Jet Propulsion Laboratory were largely responsible for the surge in the number of environmental scientists. Sharp increases in the number of biological scientists at the Argonne National Laboratory and at the Los Alamos Scientific Laboratory led the overall increase in life scientists.

Full-time scientists and engineers employed at university-administered FFRDC's[a] by field of employment: January 1976



[a]Federally Funded Research and Development Centers.
Note: Psychologists accounted for less than 50 individuals.
SOURCE: National Science Foundation

Agency

Full-time employment at FFRDC's sponsored by ERDA increased by 7 percent between 1975 and 1976 following an 11-percent jump between 1974 and 1975. In absolute numbers, ERDA's Los Alamos Scientific Laboratory registered consecutive increases of nearly 200 full-time scientists and engineers between 1974 and 1975 and over 250 between 1975 and 1976. The Argonne National Laboratory reported increases of nearly 250 full-timers in the 1974-75 period and over 100 between 1975 and 1976. In percentage terms, the largest increases over the last 2 years in full-time employment were reported by the Plasma Physics Laboratory, up 45 percent from 1974 to 1975 and by Oak Ridge Associated Universities, up 18 percent from 1975 to 1976.

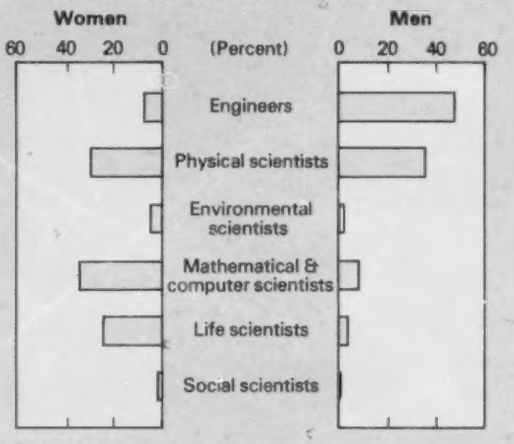
The FFRDC's supported by NASA reported a decline in personnel of 12 percent between 1974 and 1975 and an increase of 9 percent between 1975 and 1976. Almost all of the staff employed at NASA FFRDC's are accounted for by the Jet Propulsion Laboratory.

Sex Distribution

The number of women employed as full-time scientists and engineers at FFRDC's increased to more than 600 in 1976. Women employment rose 9 percent from 1975 to 1976, compared to 14 percent in the 1974-75 period. The number of men employed full-time totaling 12,400 in 1976, increased at somewhat lower rates—5 percent from 1975 to 1976 and 4 percent from 1974 to 1975. Despite the difference in growth, women continued to represent only 5 percent of all full-time scientists and engineers employed at FFRDC's. Within universities and colleges, however, women comprised 16 percent of all scientists and engineers in 1976. This difference in the proportion of women employed is understandable because engineers and physical scientists, two categories with very low representation of women at both academic institutions and FFRDC's, accounted for more than four-fifths of total employment at FFRDC's.

At FFRDC's women were employed principally in the mathematical and computer sciences (34 percent), the physical sciences (29 percent), and the life sciences (24 percent); only 8 percent of the women were employed in engineering. Nearly one-half of all men, on the other hand, were engineers and another 37 percent were physical scientists; only 9 percent of the men were mathematical and computer scientists and 4 percent were life scientists.

Full-time scientists and engineers employed at university-administered FFRDC's[a], by sex and field: January 1976



[a]Federally Funded Research and Development Centers.
Note: Psychologists accounted for less than 0.5 percent.
SOURCE: National Science Foundation

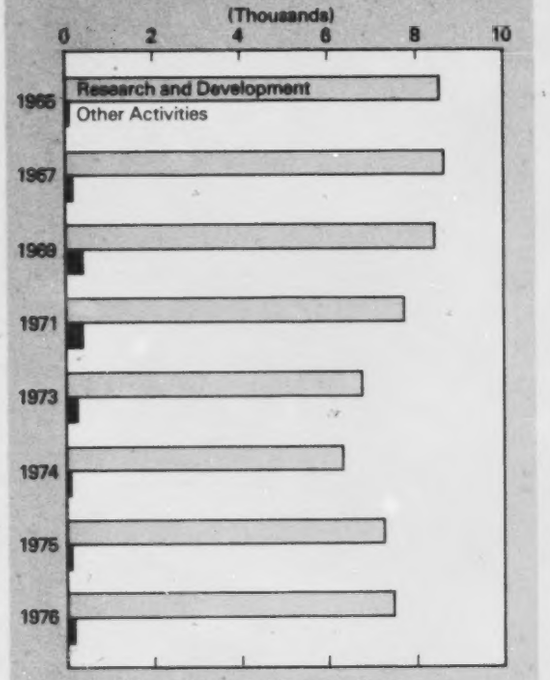
Section 2. EMPLOYMENT OF TECHNICIANS

Trends

Technicians employed in FFRDC's in 1976 numbered 7,600, a 4-percent increase over the 7,300 employed in 1975, following a 15-percent increase from 1974 to 1975. Despite the small increase relative to that between 1974 and 1975, this represents the second consecutive increase after a 7-percent annual decline that began in 1969.

As in 1975, within FFRDC's, there was a ratio of 57 technicians per 100 scientists and engineers. Over 98 percent of all technicians were primarily employed in R&D-related activities. In contrast, 65 percent of all technicians at universities and colleges were in research and the ratio of technicians to scientists and engineers was only 20 per 100.

Technicians employed at university-administered FFRDC's[a] by type of activity: January 1965-76



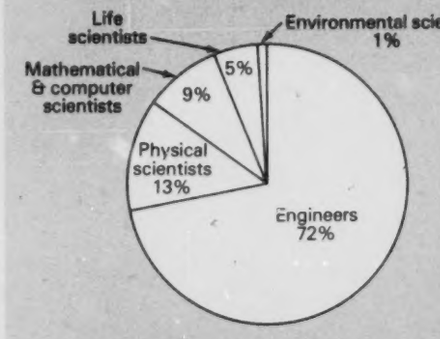
[a]Federally Funded Research and Development Centers.
SOURCE: National Science Foundation

Field of Employment

Engineering technicians comprised 72 percent of all technicians in FFRDC's in 1976 and the physical science technicians accounted for one-half the remainder. As previously mentioned, over four-fifths of all full-time scientists and engineers at FFRDC's were also employed in engineering and the physical sciences, but these two fields had a more even balance of professional staff—46 percent in engineering and 36 percent in the physical sciences.

In contrast to 1975, when all fields of employment showed increases in technicians, only three of the broad S/E fields showed increases in the number of technicians in 1976. Mathematical and computer science technicians increased by 14 percent, physical science technicians were up 13 percent, and engineering technicians rose by 4 percent.

Technicians employed at university-administered FFRDC's[a] by field of employment: January 1976



[a]Federally Funded Research and Development Centers.
Note: Social scientists and psychologists accounted for less than 0.5 percent.
SOURCE: National Science Foundation

APPENDIXES

A. Technical Notes

B. Detailed Statistical Tables

C. Reproduction of Covering Letter, Questionnaire, and Instructions

Note

The detailed statistical tables for this volume have been published separately under one cover. Included on pp. 33-41 in this volume are appendix B summary tables 4, 30, 31, 53, and 60, as well as a complete listing of all tables. Detailed statistical tables may be obtained gratis from the National Science Foundation, Washington, D.C. 20550.

APPENDIX A

Technical Notes

Scope of Survey

Survey questionnaires were mailed out in January 1976 to more than 2,200 academic institutions and 21 university-administered Federally Funded Research and Development Centers (FFRDC's). The survey universe included all institutions of higher education, including 2-year institutions, believed to offer degree-credit courses in the sciences or engineering. The survey did not include such institutions as schools of art, music, law, theology and other specialized institutions without programs in the sciences or engineering.

During the course of the survey several institutions were deleted because of ineligibility for inclusion, school closings, or mergers. At survey closeout on July 31, 1976, 2,189 universities and colleges and 21 university-associated FFRDC's remained in the study. Of the 2,210 institutions in the final universe, 1,915, or 87 percent, responded. This compared with an 82-percent response rate in 1975.

The overwhelming majority of the nonrespondents were small institutions. Among the 300 doctorate-granting institutions, which account for approximately two-thirds of all academic scientists and engineers, the number of respondents was 289, or 96 percent of the total.

Estimates for Nonresponse

In order to derive universe estimates of all employment data presented in this report, estimates were made for institutions that failed to respond to the survey. Inputed data for individual institutions were based primarily on key item totals reported (or estimated) in earlier surveys. Total for these institutions were inflated or deflated according to overall rates of fluctuations for institutions at the same degree level and under the same type of control (public or private). Detailed imputations were then made on the basis of distributions computed for similar institutions. Table A-1 shows total imputed amounts and rates of imputation for universe totals for each cell. The imputed amount for full-time scientists and engineers in 1976, for example, was 16,657, or 7 percent of the total. The imputation rates are considerably higher, of course, for some totals that represent finer aggregations, such as those for 2-year institutions. This group, which had the largest number of nonrespondent institutions, had a 19-percent imputation rate for full-time scientists and engineers.

Limitations and Modifications of Survey Coverage

Since the universe for the survey consisted of all institutions of higher education known or believed to have engaged in scientific or engineering activities, the data presented in this report are not subject to a sampling error. Some limitations must be taken into account, however, such as uneveness of response rate, by level of institution, lack of agreement among respondents in interpreting survey definitions, and unavailability of complete survey data at some institutions.

Data for earlier years were adjusted downward to reflect the deletion of historians from survey coverage in 1976. For 1975 the data reduction amounted to approximately 5 percent for total scientists.

In the 1976 survey Ed.D. degree-holders were separately identified among other doctorate-holders. This varied from previous survey instructions, which requested that they be combined with the counts for master's-holders.

The following represents a summary of identified problem areas and recommendations resulting from five recent activities involving the Survey of Scientific and Engineering Personnel Employed at Universities and Colleges. The activities included: (1) A pilot post-enumeration study conducted by Columbia Research Associates; (2) A study of data needs vs. data availability by the National Center for Higher Education Management Systems; (3) A study by Dr. Robert R. Wright on special assignment to NSF from the State University of New York involving visits to approximately 50 campuses and in-depth interviews with various academic officials responsible for responding to the survey; (4) Sponsorship of a national conference in which representatives from approximately two dozen universities were invited to discuss methods to alleviate reporting difficulties; and (5) Provision of support for a task force, representing a broad cross section of institutions comprising the Association of American Medical Colleges (AAMC) to study the feasibility of using data from AAMC's Faculty Roster file in the preparation of medical school responses to NSF's employment survey.

Specific Problem Areas

1. **Underreporting of scientists and engineers**
   Studies have revelaed that since an institution's survey response is usually aggregated from data compiled on the various academic departments of the institution, scientists and engineers employed in nonacademic departments of some institutions were not being reported; also postdoctorals not carried on an institution's payroll frequently were omitted. In some cases the counts of scientists and engineers included only faculty members, thereby excluding professional nonfaculty staff.

2. **Difficulty in reporting the teaching/R&D classification**
   Because of the close relationship between the teaching and research functions at universities, some graduate institutions have difficulty in reporting individuals in terms of "teaching" vs. "R&D" efforts. Moreover, when determining whether an individual is primarily employed in R&D activities, most institutions do not take into account the time spent on departmental research. Very few respondents keep records on departmental research involvement since it is considered to be part of the instructional programs of the institutions.

3. **Reporting by department rather than field**
   The survey requests data on field in which employed. Since institutions are organized along departmental lines, individuals are frequently reported according to the department in which they are assigned rather than the field in which they are actually employed. Moreover, in the case of a joint appointment, departmental reporting sometimes results in the misclassification of an individual as a "part-time" employee.

4. **Highest earned degree reporting not current**
   Many institutions do not maintain records of highest earned degrees of their personnel. In some cases the reported data represent the degree status at the time the employees joined the institution. In other cases the degree status reported is determined on the basis of the title held by the personnel.

5. **Inclusion of practitioners as medical scientists**
   Survey instructions call for the exclusion of medical scientists engaged primarily in patient care. It is recognized that the proportion of time spent in patient care versus teaching or research is not easily determined since frequently the functions are intertwined.

6. **Incompatibility of data at institutional level**
   Sizable year-to-year fluctuations in employment levels for individual institutions must be viewed with caution since large changes frequently are attributable to changes in reporting procedures used by institutions rather than to actual changes in employment levels. Caution in the use of institutional data should also be exercised in inter-institutional comparisons for reasons cited above.

Actions and Recommendations to Improve Data Quality and Timeliness

The problem areas mentioned in the previous section will be alleviated through current and future implementation of the following measures:

1. Periodic evaluation of survey activities. These include interviews with data providers and data users, reliability and

TABLE A-1. IMPUTATION RATES FOR ALL UNIVERSITIES AND COLLEGES: JANUARY 1976

FULL-TIME SCIENTISTS AND ENGINEERS, JANUARY 1976

ITEM 1. FIELD OF EMPLOYMENT		TOTAL	TEACHING	R&D	OTHER
ENGINEERS (TOTAL)	2110	5.9	8.2	12.3	7.9
(1)AERONAUTICAL & ASTRONAUTICAL ENGRS	2111	4.8	8.6	28.5	18.2
(2)CHEMICAL ENGINEERS	2112	6.1	8.8	5.1	16.3
(3)CIVIL ENGINEERS	2113	6.9	8.9	6.1	8.6
(4)ELECTRICAL ENGINEERS	2114	7.9	9.8	17.1	9.5
(5)MECHANICAL ENGINEERS	2115	7.8	8.9	12.5	9.2
(6)OTHER ENGINEERS	2116	4.6	8.5	11.8	5.9
PHYSICAL SCIENTISTS (TOTAL)	2120	7.2	8.9	7.7	8.7
(1)CHEMISTS	2121	7.8	9.2	7.7	9.2
(2)PHYSICISTS	2122	7.3	9.1	11.4	7.8
(3)OTHER PHYSICAL SCIENTISTS	2123	5.9	10.6	1.6	13.0
ENVIRONMENTAL SCIENTISTS (TOTAL)	2130	5.2	7.3	4.0	6.7
(1)EARTH SCIENTISTS	2131	6.5	8.0	5.8	6.3
(2)ATMOSPHERIC SCIENTISTS	2132	5.0	9.8	8.9	15.4
(3)OCEANOGRAPHERS	2133	3.4	8.3	1.5	3.8
MATHEMATICAL SCIENTISTS (TOTAL)	2140	8.6	9.3	7.4	8.5
(1)MATHEMATICIANS	2141	9.2	9.7	10.8	10.0
(2)COMPUTER SCIENTISTS	2142	7.4	10.1	3.3	8.0
LIFE SCIENTISTS (TOTAL)	2150	6.9	9.6	4.9	4.9
(1)AGRICULTURAL SCIENTISTS	2151	3.0	7.0	1.0	1.0
(2)BIOLOGICAL SCIENTISTS	2152	6.9	9.4	6.0	6.1
(3)MEDICAL SCIENTISTS	2153	9.1	12.0	5.1	9.8
PSYCHOLOGISTS (TOTAL)	2160	8.0	8.4	4.9	11.8
SOCIAL SCIENTISTS (TOTAL)	2170	7.2	8.0	6.6	4.9
(1)ECONOMISTS	2171	6.7	8.3	4.8	3.1
(2)SOCIOLOGISTS	2172	8.6	9.1	5.4	4.6
(3)POLITICAL SCIENTISTS	2173	8.4	8.7	12.9	10.7
(4)OTHER SOCIAL SCIENTISTS	2174	7.6	9.0	6.8	4.8
TOTAL HEADCOUNT	2100	7.2	8.7	5.6	6.3
FTE DISTRIBUTION, BY FUNCTION	2190	7.2	15.1	15.5	13.0

ITEM 2. HIGHEST EARNED DEGREE		TOTAL	TEACHING	R&D	OTHER
DOCTORATE HOLDERS, BY TYPE					
PH.D. OR SC.D.	2210	11.1	15.6	20.2	9.3
ED.D., J.D., ETC.	2220	10.1	11.5	12.3	7.5
M.D., D.D.S., D.V.M., ETC.	2230	15.5	22.1	26.5	16.2
MASTER'S	2240	14.3	18.5	16.5	7.8
BACHELOR'S OR THE EQUIVALENT	2250	13.0	21.9	17.2	3.8
TOTAL	2200	7.2	8.7	5.6	6.3

PART-TIME SCIENTISTS AND ENGINEERS, JANUARY 1976

ITEM 3. FIELD OF EMPLOYMENT		TOTAL	TEACHING	R&D	OTHER
ENGINEERS (TOTAL)	2310	12.1	15.6	17.5	13.3
(1)AERONAUTICAL & ASTRONAUTICAL ENGRS	2311	12.8	20.9	46.7	0.0
(2)CHEMICAL ENGINEERS	2312	11.8	17.3	13.3	50.0
(3)CIVIL ENGINEERS	2313	16.0	19.2	6.0	20.0
(4)ELECTRICAL ENGINEERS	2314	13.9	16.6	31.3	22.2
(5)MECHANICAL ENGINEERS	2315	12.8	15.3	17.8	12.5
(6)OTHER ENGINEERS	2316	10.6	17.0	12.0	10.9
PHYSICAL SCIENTISTS (TOTAL)	2320	13.5	15.1	12.4	28.6
(1)CHEMISTS	2321	15.0	16.1	18.6	34.2
(2)PHYSICISTS	2322	11.1	13.7	8.8	16.7
(3)OTHER PHYSICAL SCIENTISTS	2323	15.2	21.2	0.0	0.0
ENVIRONMENTAL SCIENTISTS (TOTAL)	2330	10.8	14.1	5.3	12.5
(1)EARTH SCIENTISTS	2331	11.6	14.7	5.1	0.0
(2)ATMOSPHERIC SCIENTISTS	2332	12.8	19.4	10.2	100.0
(3)OCEANOGRAPHERS	2333	7.5	13.1	1.8	0.0
MATHEMATICAL SCIENTISTS (TOTAL)	2340	14.9	15.6	14.0	13.3
(1)MATHEMATICIANS	2341	15.5	16.6	17.5	4.0
(2)COMPUTER SCIENTISTS	2342	15.6	19.0	10.4	19.2
LIFE SCIENTISTS (TOTAL)	2350	12.9	15.4	7.8	1.4
(1)AGRICULTURAL SCIENTISTS	2351	8.2	13.0	0.3	0.0
(2)BIOLOGICAL SCIENTISTS	2352	11.5	14.6	9.1	2.8
(3)MEDICAL SCIENTISTS	2353	14.0	16.1	8.3	1.5
PSYCHOLOGISTS (TOTAL)	2360	16.1	17.4	4.5	6.6
SOCIAL SCIENTISTS (TOTAL)	2370	12.2	13.8	9.6	1.2
(1)ECONOMISTS	2371	12.7	14.4	11.3	3.8
(2)SOCIOLOGISTS	2372	13.1	13.8	7.1	1.9
(3)POLITICAL SCIENTISTS	2373	11.7	13.7	14.7	0.0
(4)OTHER SOCIAL SCIENTISTS	2374	12.7	14.6	7.9	0.0
TOTAL HEADCOUNT	2300	13.0	14.9	8.5	5.1
FTE DISTRIBUTION, BY FUNCTION	2390	31.5	33.2	26.0	25.2

ITEM 4. HIGHEST EARNED DEGREE		TOTAL	TEACHING	R&D	OTHER
DOCTORATE HOLDERS, BY TYPE					
PH.D. OR SC.D.	2410	19.0	18.7	36.7	10.0
ED.D., J.D., ETC.	2420	14.1	14.9	37.5	4.8
M.D., D.D.S., D.V.M., ETC.	2430	25.3	27.6	32.1	1.0
MASTER'S	2440	20.3	22.1	35.0	6.0
BACHELOR'S OR THE EQUIVALENT	2450	22.2	22.0	31.9	6.0
TOTAL	2400	13.0	14.9	8.5	5.1

TABLE A-1.
CONTINUED

ITEM 5. SCIENTISTS AND ENGINEERS WITH Ph.D./Sc.D. DEGREES, BY FIELD IN WHICH PRIMARILY EMPLOYED, JANUARY 1976

FIELD OF EMPLOYMENT		TOTAL	FULL-TIME	PART-TIME
ENGINEERS	2510	14.3	14.5	18.7
PHYSICAL SCIENTISTS	2520	14.3	13.3	24.6
ENVIRONMENTAL SCIENTISTS	2530	11.7	12.1	17.0
MATHEMATICAL SCIENTISTS	2540	12.9	12.2	20.4
LIFE SCIENTISTS	2550	19.1	18.4	31.8
PSYCHOLOGISTS	2560	14.4	12.4	21.8
SOCIAL SCIENTISTS	2570	15.0	15.2	20.6
TOTAL	2500	11.6	11.0	19.0

ITEM 6. FULL-TIME SCIENTISTS AND ENGINEERS, BY FIELD IN WHICH PRIMARILY EMPLOYED, AND SEX, JANUARY 1976

FIELD OF EMPLOYMENT		TOTAL	MEN	WOMEN
ENGINEERS (TOTAL)	2610	5.9	6.2	4.3
(1)AERONAUTICAL & ASTRONAUTICAL ENGRS	2611	4.8	4.6	10.7
(2)CHEMICAL ENGINEERS	2612	8.1	6.6	10.8
(3)CIVIL ENGINEERS	2613	5.9	7.3	2.4
(4)ELECTRICAL ENGINEERS	2614	8.0	8.2	1.4
(5)MECHANICAL ENGINEERS	2615	7.8	8.1	4.4
(6)OTHER ENGINEERS	2616	4.6	5.2	5.0
PHYSICAL SCIENTISTS (TOTAL)	2620	7.2	7.9	8.8
(1)CHEMISTS	2621	7.8	8.7	9.3
(2)PHYSICISTS	2622	7.3	8.1	11.7
(3)OTHER PHYSICAL SCIENTISTS	2623	5.9	6.8	7.6
ENVIRONMENTAL SCIENTISTS (TOTAL)	2630	5.2	5.9	4.2
(1)EARTH SCIENTISTS	2631	6.5	7.4	6.8
(2)ATMOSPHERIC SCIENTISTS	2632	5.0	5.0	6.1
(3)OCEANOGRAPHERS	2633	3.4	3.7	1.5
MATHEMATICAL SCIENTISTS (TOTAL)	2640	8.6	9.0	10.4
(1)MATHEMATICIANS	2641	9.2	9.8	11.7
(2)COMPUTER SCIENTISTS	2642	7.4	8.3	6.3
LIFE SCIENTISTS (TOTAL)	2650	6.9	7.1	6.8
(1)AGRICULTURAL SCIENTISTS	2651	2.9	3.1	2.5
(2)BIOLOGICAL SCIENTISTS	2652	6.9	7.5	7.4
(3)MEDICAL SCIENTISTS	2653	9.1	11.2	9.3
PSYCHOLOGISTS (TOTAL)	2660	8.1	8.8	9.8
SOCIAL SCIENTISTS (TOTAL)	2670	7.2	8.1	9.2
(1)ECONOMISTS	2671	6.7	7.7	8.6
(2)SOCIOLOGISTS	2672	8.6	9.7	10.0
(3)POLITICAL SCIENTISTS	2673	7.4	9.2	9.6
(4)OTHER SOCIAL SCIENTISTS	2674	7.3	9.8	11.2
TOTAL HEADCOUNT	2600	7.2	8.3	8.1

ITEM 7. TECHNICIANS, BY FIELD AND FUNCTION IN WHICH PRIMARILY EMPLOYED, JANUARY 1976

FIELD OF EMPLOYMENT		TOTAL	R&D	OTHER ACTIVITIES
ENGINEERING TECHNICIANS	2810	6.9	11.1	10.7
PHYSICAL SCIENCE TECHNICIANS	2820	6.1	4.7	10.5
ENVIRONMENTAL SCIENCE TECHNICIANS	2830	3.7	3.9	8.6
MATHEMATICS TECHNICIANS	2840	12.8	16.1	16.6
LIFE SCIENCE TECHNICIANS	2850	12.5	12.0	20.3
PSYCHOLOGY TECHNICIANS	2860	1.8	2.8	3.8
SOCIAL SCIENCE TECHNICIANS	2870	1.6	3.7	0.2
TOTAL	2800	9.0	9.6	15.9

validity (R&V) studies in which an attempt is made to replicate an institution's survey response from source documents independent of the original response. Also included are consultations with academic organizations such as the Association of American Medical Colleges (AAMC), the National Association of College and University Business Officers (NACUBO), the National Center for Higher Education Management Systems (NCHEMS), the Association for Institutional Research (AIR), and individual academic institutions to discuss problem areas and develop proposals that will bring survey data requirements in line with data availability.

2. Clarification and updating of survey reporting instructions and definitions to achieve uniform interpretation of survey elements that previously were not clearly specified in the instructions sheet sent to participating institutions.

3. Strengthening of ties with academic organizations through participation in meetings and conferences of national professional societies and collaboration on special data collection efforts, such as the collection of data on full-time scientists and engineers by field and sex for AIR.

4. Various other measures recently adopted to speed survey response and ease the reporting burden on institutions. These include:

   a. Sending the questionnaire directly to the last respondent;
   b. Providing the name of an individual to be contacted for an immediate answer to any question that may arise in filling out the questionnaire;
   c. Studying the feasibility of assisting institutional respondents responsible for providing medical school data by using other information sources as benchmarks such as AAMC's Faculty Roster file;
   d. Contacting respondents more extensively through visits, telephone followups, special survey conferences, and professional meetings;
   e. Consulting with institutions prior to implementing any significant change in the survey;
   f. Providing a check list at the end of the form to help institutions avoid the most frequent kinds of reporting errors.

Survey Cycle and Response Analysis

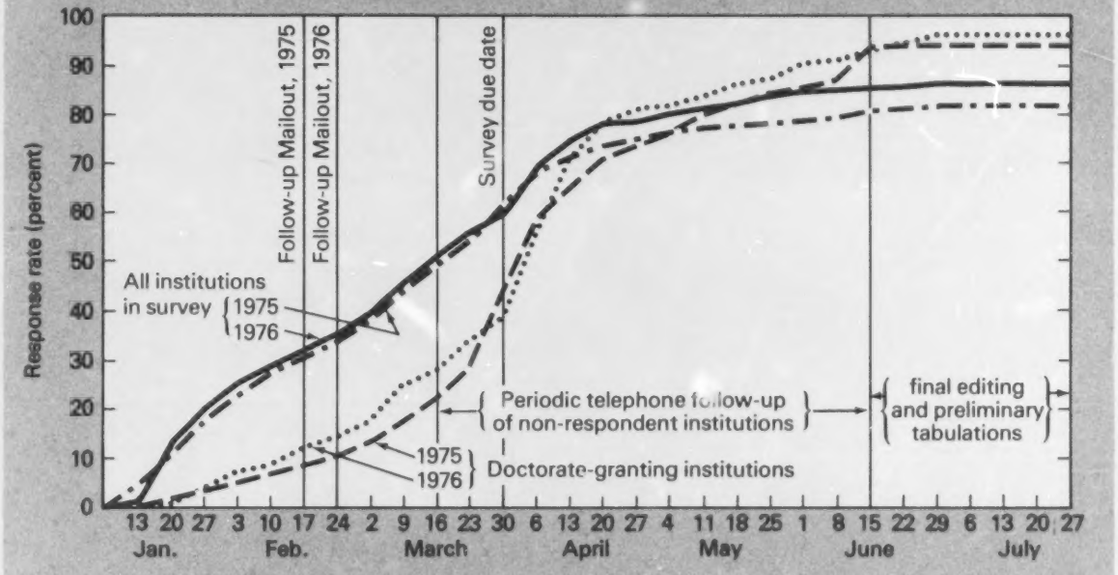
The elapsed time from the date of mailout of the 1976 survey questionnaire to the release of final tabulations was approximately 10 months. As in previous years, responses were accepted for a period covering approximately 6 months from the date of initial mailout. During this period the major NSF tasks consisted of (1) editing the forms, (2) following-up for nonresponse, which involved letters to nonrespondents as well as several hundred telephone calls, and (3) estimating for nonresponding institutions.

Note in the accompanying response analysis chart that of a total response rate of 87 percent in 1976, 69 percent had responded within 3 months of initial mailout. The remaining 18 percent took up to an additional 3 months to send in their responses. The survey could not be closed out sooner because of the importance of achieving maximum response (90 percent to 100 percent) from doctorate-granting institutions, which account for two-thirds of all scientists and engineers employed by academic institutions. Since the doctorate-granting institutions, in general, are large institutions, many of which must compile the survey data from individual departments, they necessarily lag smaller institutions in their rate of response. During the initial 3 months of the survey, the doctorate-granting institutions had a 56-percent response rate compared to 71 percent for other institutions. Over the next 3 months, however, with intensive followup on the part of NSF staff, the response rate for doctorate-granting institutions increased to 96 percent, compared to 85 percent for all other institutions.

As can be seen from the chart, between 1975 and 1976 the response curves have a similar slope. Overall response rates, however, did show improvement, from 95 percent to 96 percent for doctorate-granting institutions and from 82 percent to 87 percent for all institutions in the survey. The lower number of nonrespondent institutions in 1976 resulted in lower overall rates of imputation. Total full-time scientists and engineers, for example, showed a reduction in the rate of imputation from 9 percent in 1975 to 7 percent in 1976.

As indiciated in previous reports, the Foundation will continue its efforts to assure high response rates and improved data quality in future surveys by (1) building on the excellent cooperation received from the great majority of institutions; (2) explaining the cooperative efforts between the Foundation and academic representatives that are being made to improve the survey design; and (3) providing respondents with feedback in the form of timely reports on the survey findings, as was done following the 1974-76 employment surveys.

Response analysis for survey of scientific and engineering personnel employed at universities and colleges, 1975 vs. 1976



SOURCE: National Science Foundation

Appendix B

Statistical Tables

EMPLOYMENT OF SCIENTISTS AND ENGINEERS

Trends

B-1. By field: 1965-76 .....

B-2. By function: 1965-76 .....

B-3. By field and employment status: 1965-76 .....

B-4. By type of institution and employment status: 1965-76 .....

B-5. Full-time, by major field and control: 1969-76 .....

B-6. Full-time, by control and level of attainment: 1969-76 .....

B-7. Full-time, by field of employment and sex: 1974-76 .....

By Type of Institution

B-8. In institutions awarding doctorate degrees in the sciences or engineering, by field, control, and employment status: January 1976 .....

B-9. In institutions awarding master's degrees in the sciences or engineering, by field, control, and employment status: January 1976 .....

B-10. In institutions awarding bachelor's degrees in the sciences or engineering, by field, control, and employment status: January 1976 .....

B-11. In institutions awarding degrees in fields other than in the sciences or engineering, by field, control, and employment status: January 1976 .....

B-12. In two-year institutions, by field, control, and employment status: January 1976 .....

By Field, Employment Status, Control, Educational Attainment, Function, and Sex

B-13. By field and function: January 1975-76 .....

B-14. Full-time, by field and function: January 1975-76 .....

B-15. By field, control, and employment status: January 1976 .....

B-16. By type of institution, employment status, control, and function: January 1976 .....

B-17. By type of institution, employment status, and function: January 1975-76 .....

B-18. By type of institution, employment status, and major field: January 1976 .....

B-19. By type of institution, employment status, and level of educational attainment: January 1975-76 .....

B-20. Full-time-equivalent scientists and engineers, by type of institution, employment status, and function: January 1976 .....

B-21. by field, control, and function: January 1976 .....

B-22. Full-time, by field, control, and function: January 1976 .....

B-23. By field and type of institution: January 1975-76 .....

B-24. Full-time, by field and type of institution: January 1975-76 .....

B-25. By function, type of institution, and level of educational attainment: January 1975-76 .....

B-26. Full-time, by function, type of institution, and level of educational attainment: January 1975-76 .....

B-27. Full-time, by field and sex: January 1976 .....

B-28. Full-time, by type of institution, control, and sex: January 1976 .....

At 50 Leading Universities

B-29. Full-time, at 50 leading universities and colleges: January 1975-76 .....

B-30. Full-time, at 50 leading public universities, by employment category and sex: January 1976 .....

B-31. Full-time, at 50 leading private universities, by employment category and sex: January 1976 .....

B-32. Full-time, at 50 leading institutions awarding doctorate degrees in the sciences or engineering, by sex: January 1976 .....

B-33. Full-time, at 50 leading institutions awarding master's degrees in the sciences or engineering, by sex: January 1976 .....

B-34. Full-time, at 50 leading institutions awarding bachelor's degrees in the sciences or engineering, by sex: January 1976 .....

B-35. Full-time, at 50 leading two-year institutions, by sex: January 1976 .....

By Geographic Distribution

B-36. By control and employment status: January 1976 .....

B-37. By employment status and function: January 1976 .....

B-38. By major field: January 1976 .....

B-39. Full-time, by major field: January 1976 .....

B-40. By control and function: January 1976 .....

B-41. Full-time, by control and function: January 1976 .....

B-42. By type of institution: January 1976 .....

B-43. Full-time, by type of institution: January 1976 .....

B-44. By level of educational attainment: January 1976 .....

B-45. Full-time, by level of educational attainment: January 1976 .....

B-46. Full-time, by sex: January 1976 .....

In Research and Development

B-47. By field, control, and employment status: January 1976 .....

B-48. In institutions awarding doctorate degrees in the sciences or engineering, by field, control, and employment status: January 1976 .....

B-49. By geographic distribution, control, and employment status: January 1976 .....

Ph. D.'s

B-50. By major field, employment status, and type of institution: January 1975-76 .....

TECHNICIANS EMPLOYED IN THE SCIENCES AND ENGINEERING

B-51. By field and function: January 1975-76 .....

B-52. By field and type of institution: January 1976 .....

SUMMARY DATA FROM SURVEY QUESTIONNAIRES

Universities and Colleges

B-53. Summary data for 2,189 universities and colleges: January 1976 .....

B-54. Summary data for public universities and colleges: January 1976 .....

B-55. Summary data for private universities and colleges: January 1976 .....

B-56. Summary data for institutions awarding doctorate degrees in the sciences or engineering: January 1976 .....

B-57. Summary data for institutions awarding master's degrees in the sciences or engineering: January 1976 .....

B-58. Summary data for institutions awarding bachelor's degrees in the sciences or engineering: January 1976 .....

B-59. Summary data for two-year institutions of higher education: January 1976 .....

Federally Funded Research and Development Centers (FFRDC's) (Administered by Universities and Colleges)

B-60. Summary data for 21 FFRDC's: January 1976 .....

Table B-4 Scientists and engineers employed in universities and colleges, by type of institution and employment status: January 1965-76

Type of institution and employment status	January							
	1965	1967	1969	1971	1973	1974	1975	1976
Total	178,904	212,855	231,756	257,904	265,208	269,265	280,635	289,204
Full-time	142,713	170,557	187,082	209,416	216,741	218,843	224,784	230,539
Part-time	36,191	42,298	44,674	48,488	48,467	50,422	55,851	58,665
Doctorate in science and engineering	118,233	142,676	154,424	171,238	174,712	175,751	181,523	186,604
Full-time	94,570	114,446	124,604	140,339	143,632	144,836	149,128	154,208
Part-time	23,663	28,230	29,820	30,899	31,080	30,915	32,395	32,396
Master's in science and engineering	21,078	24,729	29,441	30,080	28,703	29,765	34,075	33,150
Full-time	17,434	20,748	25,212	25,597	24,851	24,957	27,511	26,376
Part-time	3,644	3,981	4,229	4,483	3,852	4,808	6,564	6,774
Bachelor's in science and engineering	22,423	23,025	21,690	23,198	28,363	29,187	27,576	28,168
Full-time	18,673	19,328	17,927	19,623	23,620	23,984	22,706	23,031
Part-time	3,750	3,697	3,763	3,575	4,743	5,203	4,870	5,137
No science degree 1/	17,170	22,425	26,201	33,388	33,430	34,562	37,461	41,282
Full-time	12,036	16,035	19,339	23,857	24,638	25,066	25,439	26,924
Part-time	5,134	6,390	6,862	9,531	8,792	9,496	12,022	14,358

1/ Includes two-year institutions as well as institutions awarding degrees in non-science fields.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE B-30.

FULL-TIME SCIENTISTS AND ENGINEERS AT FIFTY LEADING PUBLIC UNIVERSITIES IN EMPLOYMENT OF SCIENTISTS AND ENGINEERS, BY EMPLOYMENT CATEGORY AND SEX: JANUARY 1976

INSTITUTIONAL RANKING	TOTAL, ALL CATEGORIES		ENGINEERING		PHYSICAL SCIENCES		ENVIRON-MENTAL SCIENCES		MATHE-MATICAL SCIENCES		LIFE SCIENCES		PSYCHOLOGY		SOCIAL SCIENCES	
	GRAND TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN
TOTAL, ALL PUBLIC INSTITUTIONS	162128	24795	17015	323	18087	1336	5759	286	17196	2344	63080	12531	12037	2849	28954	5126
1 UNIVERSITY OF MICHIGAN	3041	732	338	21	258	35	96	5	102	7	1760	535	150	50	337	79
2 UNIVERSITY OF MINNESOTA	2801	456	183	0	160	10	64	4	140	12	1625	307	118	18	511	105
3 UNIV OF WISCONSIN-MADISON	2658	624	250	13	199	14	126	14	112	3	1377	394	223	77	371	109
4 OHIO STATE UNIVERSITY	2381	491	273	5	165	6	53	1	113	8	1484	438	47	3	246	30
5 UNIVERSITY OF WASHINGTON	2146	564	187	4	118	4	183	9	69	4	1411	513	44	11	134	19
6 UNIV ILLINOIS URBANA	2041	423	344	72	280	45	55	13	265	56	607	133	142	27	348	77
7 UNIVERSITY OF FLORIDA	1879	398	217	3	160	7	72	3	75	6	1136	111	63	18	249	50
8 PENNSYLVANIA STATE UNIV	1867	155	449	5	197	11	89	2	175	19	681	77	77	22	199	19
9 TEXAS A & M UNIVERSITY	1757	57	290	3	89	1	61	2	72	5	874	11	34	4	337	31
10 UNIV OF TEXAS AT AUSTIN	1603	307	257	21	359	25	109	15	134	18	199	63	148	50	397	115
TOTAL 1ST 10 INSTS.	22267	4007	2788	147	1985	158	908	68	1257	138	11154	2582	1046	280	3129	634
11 N C STATE UNIV AT RALEIGH	1600	350	196	1	61	3	16	0	110	6	1008	307	20	4	189	29
12 UNIVERSITY OF PITTSBURGH	1574	436	123	2	133	8	17	0	112	15	871	323	112	48	206	40
13 PURDUE UNIV ALL CAMPUSES	1561	138	334	3	208	11	24	1	154	15	561	77	85	18	195	13
14 MICHIGAN STATE UNIVERSITY	1555	191	118	0	173	5	35	0	129	11	714	119	115	22	271	34
15 U OF CAL LOS ANGELES	1518	195	154	3	163	7	51	3	69	5	781	145	65	10	235	22
16 RUTGERS THE STATE UNIV	1433	288	91	1	153	13	49	1	160	30	415	88	133	33	432	122
17 U OF CAL BERKELEY	1368	165	294	8	197	13	18	0	84	6	467	88	45	10	263	40
18 UNIVERSITY OF ARIZONA	1284	114	138	0	221	7	110	5	60	4	519	67	74	8	162	23
19 UNIVERSITY OF KANSAS	1214	261	86	2	87	5	51	6	71	5	567	151	107	25	245	67
20 UNIV OF MD COLLEGE PARK	1214	203	154	5	272	20	12	3	131	13	366	68	77	56	202	38
TOTAL 1ST 20 INSTS.	36588	6348	4476	172	3653	250	1291	87	2337	248	17423	4015	1879	514	5529	1062
21 UNIVERSITY OF IOWA	1213	144	65	1	74	0	13	0	62	5	816	118	30	5	153	15
22 UNIVERSITY OF COLORADO	1208	127	133	1	203	2	42	0	81	9	536	88	71	11	142	16
23 UNIV OF MISSOURI COLUMBIA	1180	109	121	0	71	4	19	0	49	0	741	88	35	5	144	12
24 U OF CAL DAVIS	1110	101	81	1	69	1	34	0	39	3	710	65	22	1	155	30
25 IOWA ST U OF SCI & TECH	1104	101	310	3	78	4	47	2	97	4	377	37	29	5	166	46
26 UNIV OF NC AT CHAPEL HILL	1094	134	0	0	127	6	50	3	79	9	673	93	49	11	116	12
27 TEMPLE UNIVERSITY	1088	230	27	1	70	8	0	0	74	8	588	132	117	34	212	47
28 UNIVERSITY OF GEORGIA	995	84	24	0	95	6	33	3	64	7	532	41	93	15	154	12
29 WEST VIRGINIA UNIVERSITY	986	138	90	2	35	1	40	0	47	11	667	111	20	4	87	9
30 OREGON STATE UNIVERSITY	979	108	130	1	93	1	102	5	72	7	451	63	21	11	110	20
TOTAL 1ST 30 INSTS.	47545	7624	5457	182	4568	283	1671	100	3001	311	23514	4851	2366	616	6968	1281
31 U OF CAL SAN FRANCISCO	914	233	0	0	0	0	0	0	2	0	911	232	1	1	0	0
32 UNIVERSITY OF HAWAII	908	131	78	2	71	5	68	2	43	2	376	74	42	6	230	40
33 VIRGINIA POLYTECHNIC INST	902	40	237	2	70	3	28	0	100	10	343	12	20	2	104	11
34 UNIV OF KENTUCKY ALL CAM	902	59	87	0	42	2	12	1	65	2	547	51	36	1	113	2
35 GEORGIA INSTITUTE OF TECH	897	38	506	11	159	4	10	0	84	6	22	4	12	1	104	12
36 U OF CAL SAN DIEGO	880	85	48	0	163	6	78	7	35	3	461	51	22	3	73	15
37 UNIVERSITY OF CONNECTICUT	868	107	82	1	73	7	22	1	44	4	461	72	59	5	127	17
38 COLORADO STATE UNIVERSITY	867	44	146	1	50	0	36	1	73	3	454	30	22	1	86	8
39 UNIV OF NEBRASKA - LNCLN	841	114	129	0	80	6	23	0	49	5	476	94	19	2	65	7
40 UNIVERSITY OF CINCINNATI	837	121	104	1	49	2	13	1	34	1	557	110	26	1	54	5
TOTAL 1ST 40 INSTS.	56361	8596	6874	200	5325	318	1961	113	3530	347	28122	5581	2625	639	7924	1398
41 U OF ILL MEDICAL CENTER	832	275	0	0	21	2	0	0	0	0	800	270	11	3	0	0
42 SUNY BUFFALO	813	74	89	1	107	4	16	0	80	8	314	27	64	7	143	27
43 UNIV ALABAMA BIRMINGHAM	805	143	22	0	29	1	3	0	41	9	661	123	23	6	26	4
44 KANSAS ST UNIVERSITY	803	122	105	1	55	1	17	0	45	4	483	108	16	2	82	6
45 CLEMSON UNIVERSITY	768	38	132	1	70	6	6	0	70	8	400	12	16	3	74	8
46 WASHINGTON STATE UNIV	738	27	93	4	38	1	8	1	55	1	400	6	35	8	109	6
47 UNIVERSITY OF ARKANSAS	735	173	72	0	52	2	19	1	27	1	351	26	21	5	193	138
48 UNIV OF MASS AT AMHERST	728	84	119	0	107	4	31	2	81	11	223	46	48	8	119	13
49 VIRGINIA COMMONWLTH UNIV	718	89	0	0	17	0	0	0	31	2	514	57	25	2	131	28
50 LSU CTR AGRI SCI/RUR DEV	677	197	7	0	0	0	0	0	1	0	652	196	0	0	17	1
TOTAL 1ST 50 INSTS.	63978	9818	7513	207	5821	339	2061	117	3961	391	32920	6452	2884	683	8818	1629
TOTAL ALL OTHER INSTS.	98150	14977	9502	116	12266	997	3698	169	13235	1953	30160	6079	9153	2166	20136	3497

NOTE: TABLE DOES NOT INCLUDE ANY LEADING INSTITUTION THAT (1) REQUIRED NATIONAL SCIENCE FOUNDATION ESTIMATES, OR (2) REQUESTED THAT ITS DATA BE HELD CONFIDENTIAL.

SOURCE: NATIONAL SCIENCE FOUNDATION.

TABLE B-31.

FULL-TIME SCIENTISTS AND ENGINEERS AT FIFTY LEADING PRIVATE UNIVERSITIES IN EMPLOYMENT OF SCIENTISTS AND ENGINEERS, BY EMPLOYMENT CATEGORY AND SEX: JANUARY 1976

INSTITUTIONAL RANKING	TOTAL, ALL CATEGORIES		ENGINEERING		PHYSICAL SCIENCES		ENVIRON-MENTAL SCIENCES		MATHE-MATICAL SCIENCES		LIFE SCIENCES		PSYCHOLOGY		SOCIAL SCIENCES	
	GRAND TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN
TOTAL, ALL PRIVATE INSTITUTIONS	68411	11134	5784	124	9095	785	1501	93	5885	749	29509	6148	4721	1128	11916	2107
1 HARVARD UNIVERSITY	3090	429	50	2	235	15	34	3	58	7	2512	377	43	8	158	17
2 CORNELL UNIVERSITY	2020	325	255	5	125	4	44	2	40	1	1119	185	26	5	411	123
3 JOHNS HOPKINS UNIVERSITY	1929	288	54	1	92	6	31	1	59	9	1521	228	30	7	142	36
4 MASS INST OF TECHNOLOGY	1807	234	678	42	387	34	86	7	132	9	320	116	31	13	173	13
5 YALE UNIVERSITY	1754	519	60	1	129	8	38	5	53	4	1281	457	41	22	152	22
6 STANFORD UNIVERSITY	1717	305	235	6	145	4	37	0	65	6	1103	259	28	10	104	20
7 WASHINGTON UNIV ST LOUIS	1674	285	63	0	64	4	1	0	29	0	1426	269	26	3	65	9
8 UNIVERSITY OF CHICAGO	1355	247	29	0	184	9	39	3	70	5	847	201	46	15	140	14
9 CASE WESTERN RESERVE UNIV	1295	180	111	2	93	3	13	0	36	2	913	159	20	3	109	11
10 COLUMBIA UNIV MAIN DIV	1289	250	101	2	143	11	86	5	41	2	770	207	32	11	116	12
TOTAL 1ST 10 INSTS.	17930	3062	1636	61	1597	98	409	26	583	45	11812	2458	323	97	1570	277
11 NEW YORK UNIVERSITY	1284	216	5	0	95	3	2	0	92	4	788	167	98	25	204	17
12 UNIV OF STHRN CALIFORNIA	1222	195	122	2	71	5	16	0	71	5	697	132	42	4	203	47
13 DUKE UNIVERSITY	1183	250	44	0	66	1	17	2	33	2	897	234	26	2	100	9
14 NORTHWESTERN UNIVERSITY	866	88	131	1	103	3	13	0	81	0	379	66	19	5	140	13
15 UNIVERSITY OF ROCHESTER	804	81	40	0	157	3	11	0	72	6	383	61	63	9	78	2
16 UNIVERSITY OF MIAMI	771	116	51	0	56	6	94	4	28	3	399	58	47	13	96	32
17 GEORGE WASHINGTON UNIV	694	168	72	0	32	3	6	0	71	8	344	99	46	21	123	37
18 BAYLOR COLLEGE OF MED	661	202	12	0	10	1	0	0	5	0	608	194	10	3	16	4
19 BOSTON UNIVERSITY	653	121	16	0	79	9	5	0	23	2	364	68	71	21	95	21
20 CALIFORNIA INST OF TECH P	647	57	133	1	250	21	73	10	53	3	100	17	1	0	37	5
TOTAL 1ST 20 INSTS.	26715	4556	2262	65	2516	153	646	42	1112	78	16771	3554	746	200	2662	464
21 PRINCETON UNIVERSITY	625	77	145	11	153	11	36	4	77	11	55	15	38	5	121	20
22 VANDERBILT UNIVERSITY	621	83	51	1	60	3	4	0	39	0	373	69	32	3	62	7
23 YESH. VA UNIVERSITY	497	128	0	0	38	0	0	0	16	1	376	95	32	24	35	8
24 GEORGETOWN UNIVERSITY	476	104	0	0	28	1	0	0	14	0	359	90	10	1	65	12
25 CARNEGIE-MELLON UNIV	455	32	145	3	143	5	0	0	62	4	38	12	24	3	43	5
26 TULANE UNIVERSITY	445	74	44	0	31	3	5	1	32	3	249	59	16	3	68	5
27 ST LOUIS UNIV	441	74	1	0	47	2	11	0	15	2	321	66	17	2	29	2
28 NEW YORK MEDICAL COLLEGE	435	25	0	0	0	0	0	0	0	0	435	25	0	0	0	0
29 LOMA LINDA UNIVERSITY	404	110	7	0	60	17	0	0	21	4	280	82	15	3	21	4
30 NORTHEASTERN UNIVERSITY	384	48	100	1	76	7	10	0	44	4	64	13	27	5	63	18
TOTAL 1ST 30 INSTS.	31498	5311	2755	81	3152	202	712	47	1432	107	19321	4080	957	249	3169	545
31 BRIGHAM YOUNG UNIVERSITY	381	15	49	0	58	0	11	0	56	4	77	6	48	3	82	2
32 THE MED COLL OF WISCONSIN	360	42	0	0	0	0	0	0	0	0	360	42	0	0	0	0
33 BROWN UNIVERSITY	358	35	57	1	62	3	18	2	52	2	72	13	19	3	78	11
34 SYRACUSE UNIVERSITY	340	7	80	1	47	0	8	0	48	0	32	0	32	0	93	6
35 ROCKEFELLER UNIVERSITY	331	40	5	0	36	0	0	0	16	0	224	30	50	10	0	0
36 WAKE FOREST UNIVERSITY	328	31	5	0	20	1	0	0	14	1	237	18	20	8	32	3
37 UNIVERSITY OF NOTRE DAME	325	10	70	0	97	2	7	0	34	0	46	3	14	2	57	3
38 RENSSELAER POLY INST	324	15	146	0	86	7	10	0	38	3	15	2	10	2	19	1
39 RICE UNIVERSITY	296	19	88	4	91	4	16	1	22	2	36	6	9	2	34	0
40 DARTMOUTH COLLEGE	285	33	23	0	28	1	9	1	22	2	131	23	17	2	55	4
TOTAL 1ST 40 INSTS.	34826	5558	3278	87	3677	220	791	51	1734	121	20551	4223	1176	281	3619	575
41 LEHIGH UNIVERSITY	276	12	115	2	45	1	9	0	48	1	10	1	9	1	40	6
42 TUFTS UNIVERSITY	272	42	36	0	33	0	3	0	17	6	133	26	15	4	35	6
43 FAIRLEIGH DICKINSON UNIV	270	49	24	1	39	3	4	0	28	3	83	18	37	13	55	11
44 LOYOLA UNIVERSITY	270	36	0	0	19	0	0	0	15	1	146	19	33	5	57	11
45 UNIVERSITY OF DAYTON	258	15	92	1	57	2	3	1	34	2	20	3	19	3	33	3
46 THOM JEFFERSON UNIV HOSP	256	42	0	0	5	1	0	0	0	0	251	41	0	0	0	0
47 CREIGHTON UNIVERSITY	250	29	0	0	15	1	0	0	6	1	207	24	7	1	15	2
48 UNIVERSITY OF DENVER	248	32	46	1	52	4	13	1	27	1	11	2	22	6	77	17
49 ALBANY MED COL OF UNION U	235	66	3	1	1	0	0	0	2	0	221	59	4	2	4	4
50 WOODS HOLE OCNGRPHIC INST	234	17	52	0	25	1	79	3	15	3	52	6	0	0	11	4
TOTAL 1ST 50 INSTS.	37395	5898	3646	93	3968	233	902	56	1926	139	21685	4422	1322	316	3946	639
TOTAL ALL OTHER INSTS.	31016	5236	2138	31	5127	552	599	37	3959	610	7824	1726	3399	812	7970	1468

NOTE: TABLE DOES NOT INCLUDE ANY LEADING INSTITUTION THAT (1) REQUIRED NATIONAL SCIENCE FOUNDATION ESTIMATES, OR (2) REQUESTED THAT ITS DATA BE HELD CONFIDENTIAL.

SOURCE: NATIONAL SCIENCE FOUNDATION.

TABLE B-53. SUMMARY DATA FOR 2,189 UNIVERSITIES AND COLLEGES: JANUARY 1976

ITEM 1. FULL-TIME SCIENTISTS AND ENGINEERS, BY FIELD AND FUNCTION IN WHICH PRIMARILY EMPLOYED; AND TOTAL FULL-TIME EQUIVALENTS (FTE) BY FUNCTION, JANUARY 1976

		TOTAL	TEACHING	R&D	OTHER
ENGINEERS (TOTAL)	2110	22799	17856	4012	931
(1)AERONAUTICAL & ASTRONAUTICAL ENGRS	2111	963	696	256	11
(2)CHEMICAL ENGINEERS	2112	1622	1281	292	49
(3)CIVIL ENGINEERS	2113	4008	3425	443	140
(4)ELECTRICAL ENGINEERS	2114	5393	4338	897	158
(5)MECHANICAL ENGINEERS	2115	4351	3669	530	152
(6)OTHER ENGINEERS	2116	6462	4447	1594	421
PHYSICAL SCIENTISTS (TOTAL)	2120	27182	21044	5645	493
(1)CHEMISTS	2121	14172	11347	2531	294
(2)PHYSICISTS	2122	10867	8535	2179	153
(3)OTHER PHYSICAL SCIENTISTS	2123	2143	1162	935	46
ENVIRONMENTAL SCIENTISTS (TOTAL)	2130	7260	5186	1909	165
(1)EARTH SCIENTISTS	2131	5592	4519	947	126
(2)ATMOSPHERIC SCIENTISTS	2132	577	316	248	13
(3)OCEANOGRAPHERS	2133	1091	351	714	26
MATHEMATICAL SCIENTISTS (TOTAL)	2140	23081	20884	1489	708
(1)MATHEMATICIANS	2141	18952	17969	813	170
(2)COMPUTER SCIENTISTS	2142	4129	2915	676	538
LIFE SCIENTISTS (TOTAL)	2150	92589	57015	27104	8470
(1)AGRICULTURAL SCIENTISTS	2151	12963	4258	4197	4508
(2)BIOLOGICAL SCIENTISTS	2152	34744	23730	10075	939
(3)MEDICAL SCIENTISTS	2153	44882	29027	12832	3023
PSYCHOLOGISTS (TOTAL)	2160	16758	14189	1215	1354
SOCIAL SCIENTISTS (TOTAL)	2170	40870	36210	3175	1485
(1)ECONOMISTS	2171	10410	8795	1136	479
(2)SOCIOLOGISTS	2172	11389	10472	634	283
(3)POLITICAL SCIENTISTS	2173	9027	8418	412	197
(4)OTHER SOCIAL SCIENTISTS	2174	10044	8525	993	526
TOTAL HEADCOUNT	2100	230539	172384	44549	13606
FTE DISTRIBUTION, BY FUNCTION	2190	230539	164874	50166	15499

ITEM 2. FULL-TIME SCIENTISTS AND ENGINEERS, BY HIGHEST EARNED DEGREE AND FUNCTION IN WHICH PRIMARILY EMPLOYED, JANUARY 1976

		TOTAL	TEACHING	R&D	OTHER
DOCTORATE HOLDERS, BY TYPE					
PH.D. OR SC.D.	2210	126160	97309	24686	4165
ED.D., J.D., ETC.	2220	3393	2913	268	212
M.D., D.D.S., D.V.M., ETC.	2230	30369	20838	7385	2146
MASTER'S	2240	53947	44095	5873	3979
BACHELOR'S OR THE EQUIVALENT	2250	16670	7229	6337	3104
TOTAL	2200	230539	172384	44549	13606

ITEM 3. PART-TIME SCIENTISTS AND ENGINEERS, BY FIELD AND FUNCTION IN WHICH PRIMARILY EMPLOYED; AND TOTAL FULL-TIME EQUIVALENTS (FTE) BY FUNCTION, JANUARY 1976

		TOTAL	TEACHING	R&D	OTHER
ENGINEERS (TOTAL)	2310	5497	4714	708	75
(1)AERONAUTICAL & ASTRONAUTICAL ENGRS	2311	164	129	30	5
(2)CHEMICAL ENGINEERS	2312	211	179	30	2
(3)CIVIL ENGINEERS	2313	987	932	50	5
(4)ELECTRICAL ENGINEERS	2314	1522	1379	134	9
(5)MECHANICAL ENGINEERS	2315	939	824	107	8
(6)OTHER ENGINEERS	2316	1674	1271	357	46
PHYSICAL SCIENTISTS (TOTAL)	2320	4315	3494	772	49
(1)CHEMISTS	2321	2421	1975	408	38
(2)PHYSICISTS	2322	1373	1141	226	6
(3)OTHER PHYSICAL SCIENTISTS	2323	521	378	138	5
ENVIRONMENTAL SCIENTISTS (TOTAL)	2330	1202	932	262	8
(1)EARTH SCIENTISTS	2331	965	804	157	4
(2)ATMOSPHERIC SCIENTISTS	2332	117	67	49	1
(3)OCEANOGRAPHERS	2333	120	61	56	3
MATHEMATICAL SCIENTISTS (TOTAL)	2340	6717	6432	157	128
(1)MATHEMATICIANS	2341	5078	4948	80	50
(2)COMPUTER SCIENTISTS	2342	1639	1484	77	78
LIFE SCIENTISTS (TOTAL)	2350	23134	18857	3647	630
(1)AGRICULTURAL SCIENTISTS	2351	1191	761	338	92
(2)BIOLOGICAL SCIENTISTS	2352	4990	3848	1071	71
(3)MEDICAL SCIENTISTS	2353	16953	14248	2238	467
PSYCHOLOGISTS (TOTAL)	2360	6099	5533	308	258
SOCIAL SCIENTISTS (TOTAL)	2370	11701	10870	591	240
(1)ECONOMISTS	2371	2760	2584	124	52
(2)SOCIOLOGISTS	2372	3770	3592	126	52
(3)POLITICAL SCIENTISTS	2373	2282	2083	102	97
(4)OTHER SOCIAL SCIENTISTS	2374	2889	2611	239	39
TOTAL HEADCOUNT	2300	58665	50832	6445	1388
FTE DISTRIBUTION, BY FUNCTION	2390	22818	18743	3349	726

ITEM 4. PART-TIME SCIENTISTS AND ENGINEERS, BY HIGHEST EARNED DEGREE AND FUNCTION IN WHICH PRIMARILY EMPLOYED, JANUARY 1976

		TOTAL	TEACHING	R&D	OTHER
DOCTORATE HOLDERS, BY TYPE					
PH.D. OR SC.D.	2410	13776	11021	2386	369
ED.D., J.D., ETC.	2420	978	904	32	42
M.D., D.D.S., D.V.M., ETC.	2430	14744	12772	1561	411
MASTER'S	2440	21543	20003	1173	367
BACHELOR'S OR THE EQUIVALENT	2450	7624	6132	1293	199
TOTAL	2400	58665	50832	6445	1388

TABLE B-53.
CONTINUED

ITEM 5. SCIENTISTS AND ENGINEERS WITH DOCTORATE DEGREES, BY FIELD IN WHICH PRIMARILY EMPLOYED, JANUARY 1976

		TOTAL	FULL-TIME	PART-TIME
ENGINEERS	2510	14984	13451	1533
PHYSICAL SCIENTISTS	2520	21979	20270	1709
ENVIRONMENTAL SCIENTISTS	2530	5241	4899	342
MATHEMATICAL SCIENTISTS	2540	13386	12223	1163
LIFE SCIENTISTS	2550	42818	39041	3777
PSYCHOLOGISTS	2560	13873	11438	2435
SOCIAL SCIENTISTS	2570	27655	24838	2817
TOTAL	2500	139936	126160	13776

ITEM 6. FULL-TIME SCIENTISTS AND ENGINEERS, BY FIELD IN WHICH PRIMARILY EMPLOYED, AND SEX, JANUARY 1976

		TOTAL	MEN	WOMEN
ENGINEERS (TOTAL)	2610	22799	22352	447
(1) AERONAUTICAL & ASTRONAUTICAL ENGRS	2611	963	935	28
(2) CHEMICAL ENGINEERS	2612	1622	1585	37
(3) CIVIL ENGINEERS	2613	4008	3925	83
(4) ELECTRICAL ENGINEERS	2614	5393	5319	74
(5) MECHANICAL ENGINEERS	2615	4351	4306	45
(6) OTHER ENGINEERS	2616	6462	6282	180
PHYSICAL SCIENTISTS (TOTAL)	2620	27182	25061	2121
(1) CHEMISTS	2621	14172	12651	1521
(2) PHYSICISTS	2622	10867	10465	402
(3) OTHER PHYSICAL SCIENTISTS	2623	2143	1945	198
ENVIRONMENTAL SCIENTISTS (TOTAL)	2630	7260	6881	379
(1) EARTH SCIENTISTS	2631	5592	5313	279
(2) ATMOSPHERIC SCIENTISTS	2632	577	544	33
(3) OCEANOGRAPHERS	2633	1091	1024	67
MATHEMATICAL SCIENTISTS (TOTAL)	2640	23081	19988	3093
(1) MATHEMATICIANS	2641	18957	16343	2614
(2) COMPUTER SCIENTISTS	2642	4124	3645	479
LIFE SCIENTISTS (TOTAL)	2650	92589	73910	18679
(1) AGRICULTURAL SCIENTISTS	2651	12963	11546	1417
(2) BIOLOGICAL SCIENTISTS	2652	34744	27757	6987
(3) MEDICAL SCIENTISTS	2653	44882	34607	10275
PSYCHOLOGISTS (TOTAL)	2660	16758	12781	3977
SOCIAL SCIENTISTS (TOTAL)	2670	40870	33637	7233
(1) ECONOMISTS	2671	10410	9458	952
(2) SOCIOLOGISTS	2672	11389	8472	2917
(3) POLITICAL SCIENTISTS	2673	9027	7999	1028
(4) OTHER SOCIAL SCIENTISTS	2674	10044	7708	2336
TOTAL HEADCOUNT	2600	230539	194610	35929

ITEM 7. TECHNICIANS, BY FIELD AND FUNCTION IN WHICH PRIMARILY EMPLOYED, JANUARY 1976

		TOTAL	R&D	OTHER ACTIVITIES
ENGINEERING TECHNICIANS	2810	5700	2982	2718
PHYSICAL SCIENCE TECHNICIANS	2820	5220	3061	2159
ENVIRONMENTAL SCIENCE TECHNICIANS	2830	1782	1374	408
MATHEMATICS TECHNICIANS	2840	4264	1418	2846
LIFE SCIENCE TECHNICIANS	2850	36566	25671	10895
PSYCHOLOGY TECHNICIANS	2860	1798	1433	365
SOCIAL SCIENCE TECHNICIANS	2870	1091	568	523
TOTAL	2800	56421	36507	19914

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE B-60. SUMMARY DATA FOR 21 FFRDC'S: JANUARY 1976

ITEM 1. FULL-TIME SCIENTISTS AND ENGINEERS, BY FIELD AND FUNCTION IN WHICH PRIMARILY EMPLOYED; AND TOTAL FULL-TIME EQUIVALENTS (FTE) BY FUNCTION, JANUARY 1976

		TOTAL	TEACHING	R&D	OTHER
ENGINEERS (TOTAL)	2110	5948	0	5846	102
(1)AERONAUTICAL & ASTRONAUTICAL ENGRS	2111	207	0	206	1
(2)CHEMICAL ENGINEERS	2112	291	0	287	4
(3)CIVIL ENGINEERS	2113	166	0	112	54
(4)ELECTRICAL ENGINEERS	2114	2689	0	2678	11
(5)MECHANICAL ENGINEERS	2115	1416	0	1405	11
(6)OTHER ENGINEERS	2116	1179	0	1158	21
PHYSICAL SCIENTISTS (TOTAL)	2120	4691	0	4677	14
(1)CHEMISTS	2121	1177	0	1171	6
(2)PHYSICISTS	2122	2961	0	2956	5
(3)OTHER PHYSICAL SCIENTISTS	2123	553	0	550	3
ENVIRONMENTAL SCIENTISTS (TOTAL)	2130	343	0	343	0
(1)EARTH SCIENTISTS	2131	159	0	159	0
(2)ATMOSPHERIC SCIENTISTS	2132	178	0	178	0
(3)OCEANOGRAPHERS	2133	6	0	6	0
MATHEMATICAL SCIENTISTS (TOTAL)	2140	1315	0	1307	8
(1)MATHEMATICIANS	2141	645	0	639	6
(2)COMPUTER SCIENTISTS	2142	670	0	668	2
LIFE SCIENTISTS (TOTAL)	2150	605	0	596	9
(1)AGRICULTURAL SCIENTISTS	2151	2	0	1	1
(2)BIOLOGICAL SCIENTISTS	2152	510	0	502	8
(3)MEDICAL SCIENTISTS	2153	93	0	93	0
PSYCHOLOGISTS (TOTAL)	2160	9	0	8	1
SOCIAL SCIENTISTS (TOTAL)	2170	96	0	91	5
(1)ECONOMISTS	2171	40	0	40	0
(2)SOCIOLOGISTS	2172	4	0	4	0
(3)POLITICAL SCIENTISTS	2173	15	0	12	3
(4)OTHER SOCIAL SCIENTISTS	2174	37	0	35	2
TOTAL HEADCOUNT	2100	13007	0	12868	139
FTE DISTRIBUTION, BY FUNCTION	2190	13007	3	12865	139

ITEM 2. FULL-TIME SCIENTISTS AND ENGINEERS, BY HIGHEST EARNED DEGREE AND FUNCTION IN WHICH PRIMARILY EMPLOYED, JANUARY 1976

		TOTAL	TEACHING	R&D	OTHER
DOCTORATE HOLDERS, BY TYPE					
PH.D. OR SC.D.	2210	4925	0	4913	12
ED.D., J.D., ETC.	2220	2	0	1	1
M.D., D.D.S., D.V.M., ETC.	2230	41	0	41	0
MASTER'S	2240	3264	0	3240	24
BACHELOR'S OR THE EQUIVALENT	2250	4775	0	4673	102
TOTAL	2200	13007	0	12868	139

ITEM 3. PART-TIME SCIENTISTS AND ENGINEERS, BY FIELD AND FUNCTION IN WHICH PRIMARILY EMPLOYED; AND TOTAL FULL-TIME EQUIVALENTS (FTE) BY FUNCTION, JANUARY 1976

		TOTAL	TEACHING	R&D	OTHER
ENGINEERS (TOTAL)	2310	37	0	37	0
(1)AERONAUTICAL & ASTRONAUTICAL ENGRS	2311	0	0	0	0
(2)CHEMICAL ENGINEERS	2312	4	0	4	0
(3)CIVIL ENGINEERS	2313	2	0	2	0
(4)ELECTRICAL ENGINEERS	2314	15	0	15	0
(5)MECHANICAL ENGINEERS	2315	8	0	8	0
(6)OTHER ENGINEERS	2316	8	0	8	0
PHYSICAL SCIENTISTS (TOTAL)	2320	144	0	143	1
(1)CHEMISTS	2321	38	0	38	0
(2)PHYSICISTS	2322	76	0	76	0
(3)OTHER PHYSICAL SCIENTISTS	2323	30	0	29	1
ENVIRONMENTAL SCIENTISTS (TOTAL)	2330	7	0	7	0
(1)EARTH SCIENTISTS	2331	2	0	2	0
(2)ATMOSPHERIC SCIENTISTS	2332	5	0	5	0
(3)OCEANOGRAPHERS	2333	0	0	0	0
MATHEMATICAL SCIENTISTS (TOTAL)	2340	42	0	42	0
(1)MATHEMATICIANS	2341	21	0	21	0
(2)COMPUTER SCIENTISTS	2342	21	0	21	0
LIFE SCIENTISTS (TOTAL)	2350	38	0	38	0
(1)AGRICULTURAL SCIENTISTS	2351	4	0	4	0
(2)BIOLOGICAL SCIENTISTS	2352	27	0	27	0
(3)MEDICAL SCIENTISTS	2353	7	0	7	0
PSYCHOLOGISTS (TOTAL)	2360	0	0	0	0
SOCIAL SCIENTISTS (TOTAL)	2370	6	0	5	1
(1)ECONOMISTS	2371	5	0	4	1
(2)SOCIOLOGISTS	2372	0	0	0	0
(3)POLITICAL SCIENTISTS	2373	0	0	0	0
(4)OTHER SOCIAL SCIENTISTS	2374	1	0	1	0
TOTAL HEADCOUNT	2300	274	0	272	2
FTE DISTRIBUTION, BY FUNCTION	2390	139	0	137	2

ITEM 4. PART-TIME SCIENTISTS AND ENGINEERS, BY HIGHEST EARNED DEGREE AND FUNCTION IN WHICH PRIMARILY EMPLOYED, JANUARY 1976

		TOTAL	TEACHING	R&D	OTHER
DOCTORATE HOLDERS, BY TYPE					
PH.D. OR SC.D.	2410	75	0	74	1
ED.D., J.D., ETC.	2420	0	0	0	0
M.D., D.D.S., D.V.M., ETC.	2430	4	0	4	0
MASTER'S	2440	89	0	88	1
BACHELOR'S OR THE EQUIVALENT	2450	106	0	106	0
TOTAL	2400	274	0	272	2

TABLE B-60.
CONTINUED

ITEM 5. SCIENTISTS AND ENGINEERS WITH DOCTORATE DEGREES, BY FIELD IN WHICH PRIMARILY EMPLOYED, JANUARY 1976

		TOTAL	FULL-TIME	PART-TIME
ENGINEERS	2510	1166	1161	5
PHYSICAL SCIENTISTS	2520	3081	3026	55
ENVIRONMENTAL SCIENTISTS	2530	208	205	3
MATHEMATICAL SCIENTISTS	2540	217	213	4
LIFE SCIENTISTS	2550	292	284	8
PSYCHOLOGISTS	2560	6	6	0
SOCIAL SCIENTISTS	2570	30	30	0
TOTAL	2500	5000	4925	75

ITEM 6. FULL-TIME SCIENTISTS AND ENGINEERS, BY FIELD IN WHICH PRIMARILY EMPLOYED, AND SEX, JANUARY 1976

		TOTAL	MEN	WOMEN
ENGINEERS (TOTAL)	2610	5948	5899	49
(1)AERONAUTICAL & ASTRONAUTICAL ENGRS	2611	207	206	1
(2)CHEMICAL ENGINEERS	2612	291	286	5
(3)CIVIL ENGINEERS	2613	166	166	0
(4)ELECTRICAL ENGINEERS	2614	2689	2674	15
(5)MECHANICAL ENGINEERS	2615	1416	1406	10
(6)OTHER ENGINEERS	2616	1179	1161	18
PHYSICAL SCIENTISTS (TOTAL)	2620	4691	4509	182
(1)CHEMISTS	2621	1177	1103	74
(2)PHYSICISTS	2622	2961	2882	79
(3)OTHER PHYSICAL SCIENTISTS	2623	553	524	29
ENVIRONMENTAL SCIENTISTS (TOTAL)	2630	343	316	27
(1)EARTH SCIENTISTS	2631	159	144	15
(2)ATMOSPHERIC SCIENTISTS	2632	178	167	11
(3)OCEANOGRAPHERS	2633	6	5	1
MATHEMATICAL SCIENTISTS (TOTAL)	2640	1315	1100	215
(1)MATHEMATICIANS	2641	645	557	88
(2)COMPUTER SCIENTISTS	2642	670	543	127
LIFE SCIENTISTS (TOTAL)	2650	605	455	150
(1)AGRICULTURAL SCIENTISTS	2651	2	2	0
(2)BIOLOGICAL SCIENTISTS	2652	510	375	135
(3)MEDICAL SCIENTISTS	2653	93	78	15
PSYCHOLOGISTS (TOTAL)	2660	9	7	2
SOCIAL SCIENTISTS (TOTAL)	2670	96	84	12
(1)ECONOMISTS	2671	40	36	4
(2)SOCIOLOGISTS	2672	4	2	2
(3)POLITICAL SCIENTISTS	2673	15	14	1
(4)OTHER SOCIAL SCIENTISTS	2674	37	32	5
TOTAL HEADCOUNT	2600	13007	12370	637

ITEM 7. TECHNICIANS, BY FIELD AND FUNCTION IN WHICH PRIMARILY EMPLOYED, JANUARY 1976

		TOTAL	R&D	OTHER ACTIVITIES
ENGINEERING TECHNICIANS	2810	5470	5376	94
PHYSICAL SCIENCE TECHNICIANS	2820	1036	1025	11
ENVIRONMENTAL SCIENCE TECHNICIANS	2830	41	41	0
MATHEMATICS TECHNICIANS	2840	679	659	20
LIFE SCIENCE TECHNICIANS	2850	379	379	0
PSYCHOLOGY TECHNICIANS	2860	0	0	0
SOCIAL SCIENCE TECHNICIANS	2870	15	15	0
TOTAL	2800	7620	7495	125

SOURCE: NATIONAL SCIENCE FOUNDATION

APPENDIX C

Reproduction of Covering Letter, Questionnaire, and Instructions

NATIONAL SCIENCE FOUNDATION

WASHINGTON, D.C. 20550

January 5, 1976

Dear Survey Participant:

The National Science Foundation requests your cooperation in its annual Survey of Scientific and Engineering Personnel Employed at Universities and Colleges. Early responses are critical to the success of the survey and the statistics help in assessing the overall effectiveness of ongoing Federal R&D efforts to strengthen science and technology in universities and colleges. Your reports will be processed immediately to include the data in (a) the National Science Board's annual report to the President, (b) NSF's Science Resources Studies Highlights, and (c) NSF's report, "National Patterns of R&D Resources."

The enclosed questionnaire is similar to the form used last year. The principal differences are the deletion of the graduate student question (item 7 in the 1975 survey) and the exclusion of historians from the current survey. The question requesting a men-women break of full-time scientists and engineers by field of employment (item 6) is being retained at the request of the Association for Institutional Research (AIR).

Included in the package is a postcard that should be returned immediately upon receipt. It will assure us that the questionnaire has reached you and will provide the names of persons to be contacted if questions arise in the follow-up and editing phases of the survey. Please complete and return the questionnaire to us by March 31, 1976.

In previous surveys some academic officials questioned the applicability of the survey to their institutions, either because the institution (1) did not perform R&D activities or (2) did not grant degrees in the sciences or engineering. Please note that the survey universe covers all institutions, including 2-year institutions, that employ professional personnel for instructional or R&D activities in the sciences or engineering.

NSF recognizes that some of the data may have to be estimated by you. If institutional records do not yield the specific breakdowns requested in an item, please provide your best estimates for the required detail.

...ta for the January 1975 survey, including a Survey Highlights and a set of selected tabulations, were published and distributed in November. Copies of these reports should have reached your desk, if you indicated interest in them in our postcard user's survey. A final report including analysis of the survey results is expected to be released early in 1976 and also will be sent to interested respondents. If you would like to have any additional data from the survey, please let us know and we will try to provide them to you.

Your continued cooperation in providing a prompt response will greatly assist NSF in its efforts to compile and release the survey results on a timely basis. If you have any questions, please contact me or Mr. Robert Loycano. We may be reached on Area Code 202, 282-7790.

Sincerely yours,

Richard M. Berry

Richard M. Berry, Study Director
Universities and Nonprofit
Institutions Studies Group
Division of Science Resources Studies

Enclosures

OMB No. 99-R0282
Approval expires December 31, 1976

NATIONAL SCIENCE FOUNDATION
Washington D.C. 20550

SURVEY OF SCIENTIFIC AND ENGINEERING PERSONNEL EMPLOYED AT UNIVERSITIES AND COLLEGES, JANUARY 1976

Organizations are requested to complete and return this form to:

NATIONAL SCIENCE FOUNDATION
1800 G Street, N.W.
Washington, D.C. 20550 Attn: UNISG

Name and address of institution:
(Please correct if name or address has changed)

This survey requests employment data as of January 1976. The completed 1976 questionnaire should be returned to NSF by March 31, 1976. Your cooperation in returning the survey questionnaire promptly is appreciated.

Please read the enclosed instructions before completing this form. If you have any questions about the completion of this form, **contact Robert Loycano (202-282-7790).** Where exact data are not available, use estimates. Please complete all items; estimates by college officials will be better than NSF estimates. Enter "0" as an item total (lines 2100, 2200, etc., are item totals) rather than leave the total blank.

All entries should be in whole numbers. Do not enter decimals or fractions.

Institutions of Higher Education

Include data for branches (including regional campuses) and all organizational units of your institution, such as a medical school or agricultural experiment station. Also include any hospital or clinic owned, operated, or controlled by the university, and integrated operationally with the clinical programs of your medical school. **Exclude** data for any Federally Funded Research and Development Centers (FFRDC's) administered by your institution. **(See below.)**

Please classify your institution according to (1) highest degree granted in the sciences or engineering and (2) primary administrative control.

Highest degree granted in the sciences or engineering during 1974-75	Check one	One science or engineering field in which highest degree was awarded	Check primary administrative control of your institution	
Ph.D.	☐		Federal	☐
M.D., D.D.S., etc.	☐		State	☐
Master's	☐		Local	☐
Bachelor's or equivalent	☐		Private	☐
Degree other than in science or engineering	☐			
2-year program	☐			

Federally Funded Research and Development Centers (FFRDC's)

Separate forms have been mailed directly to all FFRDC's administered by academic institutions. A list of these centers appears on page 2 of the Instructions and Definitions.

SECTION A. NUMBER OF SCIENTISTS AND ENGINEERS, JANUARY 1976

(Include postdoctorals, exclude graduate students)

Item 1. Full-time scientists and engineers, by field and function in which primarily employed (enter the totals of 1a thru 1g in 1h); and total full-time equivalents (FTE) by function, January 1976 (enter in 1i)

FIELD OF EMPLOYMENT		TOTAL (1)	TEACHING (2)	R&D (3)	Other activities (4)
a. Engineers (total)	2110				
(1) Aeronautical & astronautical engineers	2111				
(2) Chemical engineers	2112				
(3) Civil engineers	2113				
(4) Electrical engineers	2114				
(5) Mechanical engineers	2115				
(6) Other engineers	2116				
b. Physical scientists (total)	2120				
(1) Chemists	2121				
(2) Physicists	2122				
(3) Other physical scientists	2123				
c. Environmental scientists (total)	2130				
(1) Earth scientists	2131				
(2) Atmospheric scientists	2132				
(3) Oceanographers	2133				
d. Mathematical scientists (total)	2140				
(1) Mathematicians (exclude computer scientists)	2141				
(2) Computer scientists (exclude programmers)	2142				
e. Life scientists (total)	2150				
(1) Agricultural scientists	2151				
(2) Biological scientists	2152				
(3) Medical scientists (see instructions, p.1)	2153				
f. Psychologists (total)	2160				
g. Social scientists (total) (exclude historians)	2170				
(1) Economists	2171				
(2) Sociologists	2172				
(3) Political scientists	2173				
(4) Other social scientists	2174				
h. Total headcount (sum of a thru g) 1/	2100				
i. FTE distribution, by function 2/	2193				

Item 2. Full-time scientists and engineers, by highest earned degree and function in which primarily employed, January 1976

HIGHEST EARNED DEGREE		TOTAL (1)	TEACHING (2)	R&D (3)	Other activities (4)
Doctorate holders, by type:					
a. Ph.D. or Sc.D.	2210				
b. Ed.D., J.D., etc.	2220				
c. M.D., D.D.S., D.V.M., etc.	2230				
d. Master's	2240				
e. Bachelor's or the equivalent	2250				
f. Total (sum of a thru e)	2200				

1/ Total on line 1h should be the same as the corresponding totals in line 2f.

2/ The total reported in item 1i, column 1, should, by definition, be the same as the total in item 1h, column 1. However, the FTE distribution by function (columns 2-3, and 4) will not necessarily coincide with the functional distribution on a "primarily employed" basis in line 1h.

Item 3. Part-time scientists and engineers, by field and function in which primarily employed (enter the totals of 3a thru 3g in 3h); and total FTE's by function, January 1976 (enter in 3i) (exclude graduate students).

FIELD OF EMPLOYMENT		TOTAL (1)	TEACHING (2)	R&D (3)	Other activities (4)
a. Engineers (total)	2310				
(1) Aeronautical & astronautical engineers	2311				
(2) Chemical engineers	2312				
(3) Civil engineers	2313				
(4) Electrical engineers	2314				
(5) Mechanical engineers	2315				
(6) Other engineers	2316				
b. Physical scientists (total)	2320				
(1) Chemists	2321				
(2) Physicists	2322				
(3) Other physical scientists	2323				
c. Environmental scientists (total)	2330				
(1) Earth scientists	2331				
(2) Atmospheric scientists	2332				
(3) Oceanographers	2333				
d. Mathematical scientists (total)	2340				
(1) Mathematicians (exclude computer scientists)	2341				
(2) Computer scientists (exclude programmers)	2342				
e. Life scientists (total)	2350				
(1) Agricultural scientists	2351				
(2) Biological scientists	2352				
(3) Medical scientists (see instructions, p.1.)	2353				
f. Psychologists (total)	2360				
g. Social scientists (total) (exclude historians)	2370				
(1) Economists	2371				
(2) Sociologists	2372				
(3) Political scientists	2373				
(4) Other social scientists	2374				
h. Total headcount (sum of a thru g) 1/	2300				
i. FTE distribution, by function 2/	2390				

Item 4. Part-time scientists and engineers, by highest earned degree and function in which primarily employed, January 1976

HIGHEST EARNED DEGREE		TOTAL (1)	TEACHING (2)	R&D (3)	Other activities (4)
Doctorate holders, by type:					
a. Ph.D. or Sc.D.	2410				
b. Ed.D., J.D., etc.	2420				
c. M.D., D.D.S., D.V.M., etc.	2430				
d. Master's	2440				
e. Bachelor's or the equivalent	2450				
f. Total (sum of a thru e)	2400				

1/ Totals in line 3h should be the same as the corresponding totals in line 4f.

2/ The totals in item 3i converting figures on part-time employment into FTE's will necessarily differ from headcount totals in line 3h.

Item 5. Scientists and engineers with doctorate degrees, by field in which primarily employed, January 1976 (include only Ph.D's and Sc.D's reported in items 2a and 4a. Exclude M.D., D.D.S. degrees, etc.)

FIELD OF EMPLOYMENT		TOTAL (1)	FULL TIME (2)	PART TIME (3)
a. Engineers	2510			
b. Physical scientists	2520			
c. Environmental scientists	2530			
d. Mathematical scientists	2540			
e. Life scientists	2550			
f. Psychologists	2560			
g. Social scientists (exclude historians)	2570			
h. Total (sum of a thru g) 3/	2500			

3/ 5h, column 2 must equal 2a, column 1; 5h, column 3 must equal 4a, column 1.

Item 6. Full-time scientists and engineers, by field in which primarily employed, and sex, January 1976. (Totals reported in item 6, column 1, should equal the totals reported in item 1, column 1.)

FIELD OF EMPLOYMENT		TOTAL (1)	MEN (2)	WOMEN (3)
a. Engineers (total)	2610			
(1) Aeronautical & astronautical	2611			
(2) Chemical engineers	2612			
(3) Civil engineers	2613			
(4) Electrical engineers	2614			
(5) Mechanical engineers	2615			
(6) Other engineers	2616			
b. Physical scientists (total)	2620			
(1) Chemists	2621			
(2) Physicists	2622			
(3) Other physical scientists	2623			
c. Environmental scientists (total)	2630			
(1) Earth scientists	2631			
(2) Atmospheric scientists	2632			
(3) Oceanographers	2633			
d. Mathematical scientists (total)	2640			
(1) Mathematicians (exclude computer scientists)	2641			
(2) Computer scientists (exclude programmers)	2642			
e. Life scientists (total)	2650			
(1) Agricultural scientists	2651			
(2) Biological scientists	2652			
(3) Medical scientists (see instructions, p.1.)	2653			
f. Psychologists (total)	2660			
g. Social scientists (total) (exclude historians)	2670			
(1) Economists	2671			
(2) Sociologists	2672			
(3) Political scientists	2673			
(4) Other social scientists	2674			
h. Total headcount (sum of a thru g)	2600			

SECTION B. NUMBER OF TECHNICIANS EMPLOYED IN THE SCIENCES AND ENGINEERING, January 1976

Item 7. Technicians, by field and function in which primarily employed, January 1975

FIELD OF EMPLOYMENT		TOTAL (1)	R&D (2)	Other activities (3)
a. Engineering technicians	2810			
b. Physical science technicians	2820			
c. Environmental science technicians	2830			
d. Mathematics technicians	2840			
e. Life science technicians	2850			
f. Psychology technicians	2860			
g. Social science technicians	2870			
h. Total (sum of a thru g)	2800			

CHECK LIST

1. Are all entries rounded to whole numbers? (Do not enter fractions or decimals.)
2. Do the data add to subtotals?
3. Are all items completed? YOUR ESTIMATES will be better than none. Estimates may be noted on a separate sheet.
4. Are all branches and components such as a medical school and agricultural experiment station included?
5. Have you included all postdoctorals?

CONFIDENTIALITY

The National Science Foundation recognizes that its ability to gather much of the enclosed information would be severely impaired if it could not be held in confidence. Please indicate below the number of any items which would not be supplied but for assurance that the source will be held in confidence. The Foundation will hold in confidence such information to the extent permitted by law.

ITEM

1975–1976 DATA CHECK

Please compare your January 1976 personnel data with your response for January 1975, particularly for the following item totals. Please explain below or on a separate sheet any significant changes and where possible, indicate any required adjustments in data reported in previous surveys.

	1975	1976
Total full-time scientists & engineers	Line 2100, col. 1	Line 2100, col. 1
Total part-time scientists & engineers	Line 2300, col. 1	Line 2300, col. 1
Total technicians employed in the sciences and engineering	Line 2800, col. 1	Line 2800, col. 1

REMARKS

PLEASE TYPE OR PRINT

NAME OF PERSON SUBMITTING THIS FORM	TITLE	AREA CODE	EXCH	NO.	EXT
NAME OF PERSON WHO PREPARED THIS SUBMISSION (If different from above)	TITLE	AREA CODE	EXCH	NO.	EXT

NAME OF INSTITUTION	DATE	ADDRESS (number, street, city, State, ZIP code)

NSF Form 724 (11-75)
Instruction sheet

NATIONAL SCIENCE FOUNDATION
WASHINGTON, D.C. 20550

SURVEY OF SCIENTIFIC AND ENGINEERING PERSONNEL EMPLOYED AT UNIVERSITIES AND COLLEGES, JANUARY 1976

INSTRUCTIONS AND DEFINITIONS

The National Science Foundation requests your cooperation in completing the attached questionnaire covering the personnel characteristics of your institution as they relate to the sciences and engineering. This form requests employment data as of January 1976. The questionnaire should be completed and returned to NSF by **March 31, 1976.**

This survey is comparable to that conducted by this office for last year, which included manpower as of January 1975. The major difference is the deletion of the question concerning graduate students. Where data reported in the current survey differ significantly from those reported in the previous survey, please indicate the reasons for the difference, such as "opening of new medical school," etc., at the end of the questionnaire or on a separate sheet of paper.

If you have any questions regarding information requested on this form, write or telephone Mr. Robert Loycano at the Universities and Nonprofit Institutions Studies Group, Division of Science Resources Studies, National Science Foundation, 1800 G Street, N.W., Washington, D.C. 20550 (Telephone (202)282-7790). Additional forms, as well as copies of previous responses, may be obtained by writing to the above address.

Institutions of Higher Education

Academic institutions should include in the form for the parent institution data on professional and technical personnel employed in the sciences and engineering in all branches and other units of the parent institution, *including* regional campuses, medical school, or an agricultural experiment station, but *excluding* an associated Federally Funded Research and Development Center (FFRDC). FFRDC's are to report their data separately from the administering university.

Include all personnel who were paid a salary or stipend, including *postdoctorals*, and other staff, such as members of religious orders, who received no remuneration while employed at the institution.

Exclude: (1) personnel on sabbatical or other leave status; (2) personnel employed in branches of your institution located in foreign countries; (3) unpaid voluntary staff; (4) student health service personnel; (5) agricultural extension personnel primarily involved in teaching; (a) farm management marketing; (b) home economics; (c) 4-H youth programs; and, (d) business and public administration.

Medical Schools

Incorporate data for medical schools in the data for the parent institution. Medical schools are those two- or four-year schools of medicine approved by the Council on Medical Education and Hospitals and the Association of American Medical Colleges. Include (1) teaching and R&D functions of hospitals or clinics owned, operated, or controlled by universities and integrated operationally with the clinical programs of their medical schools; (2) research bureaus or institutes which are integral parts of medical schools; (3) research bureaus and institutes which are nonuniversity owned but are affiliated with the medical school and any university bureaus, and institutes which may be outside the departmental structure of universities, but whose senior research staff members hold teaching appointments with medical schools.

Personnel employed at such organizations that are to be reported in the survey include: physicians (residents and nonresidents), dentists, public health specialists, pharmacists, etc., who spend the greatest proportion of their time in teaching, clinical investigation, or other R&D activities.

Exclude: (1) all medical practitioners who spend the greatest proportion of their time providing patient care, dispensing drugs or services, or in diagnosis, etc.; (2) scientists whose primary employment is at independent hospitals even though they may perform some teaching or research functions for your institution through cooperative agreements; (3) interns; (4) nurses; (5) allied health professionals such as nurse anesthetists, occupational therapists, and physical therapists; and, (6) unpaid voluntary staff at medical or dental schools.

Federally Funded Research and Development Centers

For purposes of this survey, FFRDC's are defined as R&D organizations exclusively or substantially financed by the Government, and administered on a contractual basis by educational institutions or other organizations. The following is a current list of FFRDC's administered by universities and colleges:

Ames Laboratory
Applied Physics Laboratory (Johns Hopkins University)
Argonne National Laboratory
Brookhaven National Laboratory
Center for Naval Analyses
Cerro Tololo Inter-American Observatory
E.O. Lawrence Berkeley Laboratory
E.O. Lawrence Livermore Laboratory
Jet Propulsion Laboratory
Kitt Peak National Observatory
Lincoln Laboratory
Los Alamos Scientific Laboratory
Fermi National Accelerator Laboratory
National Astronomy and Ionosphere Center
National Center for Atmospheric Research
National Radio Astronomy Observatory
Oak Ridge Associated Universities
Ordnance Research Laboratory
Plasma Physics Laboratory
Space Radiation Effects Laboratory
Stanford Linear Accelerator Center

Data Elements Required to Complete This Survey

If the following seven characteristics are known for each science and engineering employee, the request can be completed without estimates. The characteristics are further described elsewhere in the instructions.

1. Scope of personnel included:
   a. Scientists and engineers
   b. Science and engineering technicians
2. Assignment status:
   a. Full time
   b. Part time
3. Field of employment (22 fields in 7 groupings)
4. Full-time equivalent (FTE)
5. Function:
   a. Teaching
   b. Research and development
   c. Other science and engineering activities
6. Highest earned degree:
   a. Ph.D. or Sc.D.
   b. Ed.D., J.D., etc.
   c. M.D., D.D.S., D.V.M., etc.
   d. Master's
   e. Bachelor's or its equivalent
7. Classification of scientists and engineers by sex.

Classification of Fields of Employment in the Sciences and Engineering

Listed below are the broad and detailed fields of employment corresponding to the fields shown on the questionnaire (with illustrative disciplines in each field.

Please classify persons (including those employed in interdisciplinary or multidisciplinary specializations) in the listed fields with which their activities (teaching, research, or other) are most closely identified. In the case of a scientist employed in a general category

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such as science education he should be reported in the field most closely related to the academic requirements of his position—such as mathematics, sociology, or psychology.

It is recognized that because of the importance of academic departments in the organizational structure and, thus, in the information system of institutions of higher education, many institutions must report individuals in terms of the departmental assignment shown in the personnel information system. In some instances, the designated department will not necessarily be the same as the field in which an individual is actually employed.

Because of the departmental structure, however, it is important that respondents include in the survey organizational units that are not part of any academic department. For example, scientists and engineers employed at a computer center not affiliated with a particular academic department should be included in the survey.

ENGINEERING

Aeronautical and astronautical: aerodynamics, aerospace, space technology
Chemical: ceramic, petroleum, petroleum refining, process
Civil: architectural, hydraulic, hydrologic, marine, sanitary and environmental, structural, transportation
Electrical: communication, electronic, power
Mechanical: engineering mechanics
Other engineering: agricultural, industrial and management, metallurgical and materials, mining, nuclear, ocean engineering systems, textile, welding

PHYSICAL SCIENCES

Chemistry: analytical, inorganic, organo-metallic, organic, pharmaceutical, physical, polymer science (exclude biochemistry)
Physics: acoustics, atomic and molecular, condensed matter, elementary particles, nuclear structure, optics, plasma
Other physical sciences: astronomy (laboratory astrophysics, optical astronomy, radio astronomy, theoretical astrophysics, X-ray, gamma-ray, neutrino astronomy), metallurgy

ENVIRONMENTAL SCIENCES (terrestrial and extraterrestrial)

Earth sciences: engineering geophysics, general geology, geodesy and gravity, geomagnetism, hydrology, inorganic geochemistry, isotopic geochemistry, organic geochemistry, lab geophysics, paleomagnetism, paleontology, physical geography and cartography, seismology, soil sciences
Atmospheric sciences: aeronomy, solar, weather modification, extraterrestrial atmospheres, meteorology
Oceanography: biological oceanography, chemical oceanography, geological oceanography, physical oceanography, marine geophysics

MATHEMATICAL SCIENCES

Mathematics: algebra, analysis, applied mathematics, foundations and logic, geometry, numerical analysis, statistics, topology
Computer science: computer programming;[1] computer and information sciences (general); design, development, and application of computer capabilities to data processing and manipulation; information sciences and systems; systems analysis

LIFE SCIENCES

Agricultural sciences: agronomy, animal science, dairy science, food science and technology, forestry, horticulture, poultry science
Biological sciences: anatomy, bacteriology, biochemistry, biogeography, biophysics, ecology, embryology, entomology, evolutionary biology, genetics, immunology, microbiology, nutrition and metabolism, parasitology, pathology, pharmacology, physical anthropology, physiology, plant sciences, radiobiology, systematics
Medical sciences: internal medicine, neurology, ophthalmology, preventive medicine and public health, psychiatry, radiology, surgery, veterinary medicine, dentistry, pharmacy, podiatry

PSYCHOLOGY: animal behavior; clinical psychology; comparative psychology; counseling and guidance; development and personality; educational, personnel, vocational psychology and testing; experimental psychology; ethology; industrial and engineering psychology; social psychology

SOCIAL SCIENCES

Economics: agricultural economics; econometrics and economic statistics; history of economic thought; international economics; industrial, labor and agricultural economics; macroeconomics; microeconomics; public finance and fiscal policy; theory; economic systems and development
Sociology: comparative and historical, complex organizations, culture and social structure, demography, group interactions, social problems and social welfare, sociological theory
Political science: area or regional studies; comparative government; history of political ideas; international relations and law; national, political and legal systems; political theory; public administration
Other social sciences: cultural anthropology, history of science, linguistics, socioeconomic geography, research in education, and research in law, i.e., attempt to assess impact on society of legal systems and practices.

[1] Personnel employed as computer programmers should be reported as technicians (item 7).

Section A—Number of Scientists and Engineers, January 1976

(Includes postdoctorals, excludes graduate students)

This section requests data on full- and part-time employed scientists and engineers. Scientists and engineers include faculty members, postdoctorals, and other professionals (at a level at which the knowledge acquired by academic training equal to a bachelor's degree is essential in the performance of duties) working in the sciences and engineering at your institution, including those in research administration.

Two of the most common methods used to determine an individual's full-time employment are (1) his or her working 40 hours per week, or, (2) teaching 12 credit hours per week. (The preceding serve as illustrations only; the "full-time" workload may vary somewhat from institution to institution.)

Item 1. Full-time scientists and engineers, by field and function in which *primarily* employed, January 1976.

In items 1a through 1h, the functional classification of professional personnel into teaching (column 2), R&D (column 3), and other science and engineering activities (column 4), should be based on the function in which the person is primarily engaged or employed at the institution. For example, a person engaged in two or all three of the specified functional categories should be classified in the function in which he spends the largest proportion of his time. Exclude outside consulting work and teaching not performed under the auspices of your institution.

In classifying personnel by function, note that determinations made solely on the basis of job titles may produce a significant bias, primarily toward teaching. Persons with professorial rank may also be engaged in research. Among the factors that may be considered in determining the primary function of an individual are both his "separately budgeted" R&D assignment *and* his estimated departmental research workload.

In classifying an individual under a particular category (teaching, research and development, or other science and engineering activities), take into consideration all official activities even if carried on in a school or department other than the one in which he holds his principal appointment.

Teaching (column 2) is defined as encompassing those activities connected with degree-credit courses or which are intended to lead ultimately to the granting of degrees or certificates or to professional certification or licensing. Included are such functions as instruction and training performed in connection with degree-credit courses and the administration of such instruction and training.

Include under "teaching" any academic administrator—such as the president, a dean, a department chairman—who holds a science or engineering degree, unless the individual is primarily involved in the administration of R&D activities. If the individual cannot be identified with one specific discipline, report the field of his highest earned degree. Administrators primarily involved in R&D activities should be reported in the "R&D" column.

Include instruction of interns, residents, and other professional personnel receiving advanced training such as postdoctoral fellows or trainees.

Time spent by faculty or other staff members in supervising the thesis work of graduate students is considered to be part of the teaching function.

Exclude instructors in nursing, dental hygiene, etc.

Research and development (column 3) include basic and applied research in the sciences and in engineering, and design and development of prototypes and processes.

Research is a systematic, intensive study directed toward fuller knowledge of the subject studied. Included in this function is the preparation for publication of books and papers describing the results of the specific research and development, if carried out as an integral part of that research and development. Also included is the *administration* of research and development.

Development is the systematic use of knowledge directed toward the design and

production of useful prototypes, materials, devices, systems, methods, or processes. It does not include quality control or routine product testing.

Under *other science and engineering activities* (column 4) report all professional personnel not primarily employed in teaching or research and development, as defined above. Examples of such activities are agricultural demonstration work not specifically excluded on page 1; adult education (if not degree credit); dissemination of scientific information; student counseling by individuals with a degree in psychology. *Exclude* hospital employees predominantly involved in patient services, Student Health Service professionals, and other individuals that are not primarily engaged in science or engineering activities. *Do not use* this category to report individuals for which there is difficulty in determining their primary function. It is preferable that you classify each person in the most appropriate functional category according to your best estimate.

Full-time-equivalent distribution, by function. In line 1i, apportion staff members across the three functions on the basis of the proportion of effort or time spent in each of the functions, thus correcting for the "primarily engaged" head-count data reported in line 1h. For example, an individual devoting three-fourths time to teaching and one-fourth to research and development should be counted as 0.75 in teaching and 0.25 in research and development. The FTE values should be cumulated for each function. This sum should then be *rounded to the nearest whole number* before entering the number on the questionnaire. In item 1i, figures entered in columns (2), (3), and (4) should add to the total in column (1).

Item 2. Full-time scientists and engineers, by highest earned degree and function in which *primarily* employed, January 1976.

For the purposes of this survey, earned degrees are classified in five categories as defined below:

a. "Ph.D. or Sc.D." degrees include all such earned degrees. Include individuals holding both the Ph.D. (or Sc.D.) degree and another doctorate degree.

b. "Ed.D., J.D., etc." include all such earned degrees.

c. "M.D., D.D.S., D.V.M., etc." includes individuals whose highest earned degrees are first-professional medical degrees that indicate the completion of the academic requirements based on programs that require at least two academic years of previous college work for entrance and require a total of at least six academic years of college work for completion. Specifically, include in line 2c first-professional degrees in medicine (M.D.), Dentistry (D.D.S. or D.M.D.), Veterinary Medicine (D.V.M.), Chiropody or Podiatry (D.S.C. or D.P.), and Osteopathy (D.O.). Individuals holding both the Ph.D. (Sc.D.) degree and a first-professional degree, such as the M.D., should be included in line 2a as mentioned in (a) above.

d. "Master's" degrees include all degrees above the bachelor's and first-professional degree and other than the doctorate degrees reported in lines 2a thru 2c.

e. "Bachelor's or the equivalent" include all individuals whose highest earned degree is the bachelor's degree or a four- or five-year first-professional degree, or who have the equivalent in experience, even if they have not earned such a degree.

Item 3. Part-time scientists and engineers, by field and function in which *primarily* employed, January 1976.

Instructions for item 1 (1a thru 1h) relating to classification by field and function also relate to part-time professional staff in item 3.

In estimating the full-time equivalents of part-time personnel in item 3i, take into account both the overall workload and the proportion of time spent on each of the three functions of activity. For example, if the full-time workload were 40 hours per week, and an individual were estimated to spend 10 hours on teaching and related duties and 6 hours on research, his FTE values would be: Teaching — .25 (10/40); R&D — .15 (6/40). The FTE values should be cumulated for each function and *rounded to the nearest whole number* before entering the number on the questionnaire. The FTE values entered in columns (2), (3), and (4) should then be summed to arrive at the total to be entered in column (1).

Item 4. Part-time scientists and engineers, by highest earned degree and function in which *primarily* employed, January 1976.

Instructions for item 2 relating to the classification by field and highest earned degree also relate to part-time professional staff in item 4.

Item 5. Scientists and engineers with doctorate degrees, by field in which *primarily* employed, January 1976.

Include only Ph.D.'s and Sc.D.'s reported in items 2a and 4a. Exclude Ed.D., J.D., M.D., D.D.S. degrees, etc. The total number in item 5h, column 2 should equal the number shown in item 2a, column 1; the total number in item 5h, column 3 should equal the number shown in item 4a, column 1.

Item 6. Full-time scientists and engineers, by field in which *primarily* employed and sex, January 1976.

Institutions are requested to report total full-time scientists and engineers, by sex and field in which *primarily* employed. Data in column 1 (total of men and women) should equal data shown in item 1, column 1.

Section B—Number of Technicians Employed in the Sciences and Engineering, January 1976

Item 7. Technicians, by field and function in which primarily employed, January 1976.

Technicians *include* all persons employed in positions which involve technical work at a level requiring knowledge in any of the fields of engineering, mathematics, physical sciences, environmental sciences, life sciences, psychology, or social sciences comparable to that acquired through formal post-high school training (less than a bachelor's degree), such as that obtained at technical institutes and junior colleges or through equivalent on-the-job training or experience. All personnel performing the duties described above should be reported as technicians even if they hold a bachelor's or higher degree. Some typical job titles include laboratory technician or assistant, physical science aide, engineering aide, statistical aide, draftsman, and computer programmer.

Exclude: graduate students; technicians involved primarily in patient care service in university-affiliated hospitals; craftsmen such as electricians, carpenters, machinists, etc. In the case where undergraduate students, juniors or seniors, are employed in R&D activities, they may, where applicable, be included as technicians.

Other Science Resources Publications

REPORTS	NSF No.	Price
Women and Minorities in Science and Engineering	77-304	$0.75
Detailed Statistical Tables. Federal Support to Universities, Colleges, and Selected Nonprofit Institutions, Fiscal Year 1975	77-303	——
Characteristics of the National Sample of Scientists and Engineers, 1974		
Part 1. Demographic and Educational	75-333	$1.90
Part 2. Employment	76-323	$2.80
Part 3. Geographic	76-330	$2.00
U.S. Scientists and Engineers, 1974	76-329	$1.25
An Analysis of Federal R&D Funding by Function, Fiscal Years 1969-1977	76-325	$2.45
Research and Development in Industry, 1974. Funds, 1974; Scientists & Engineers, January 1975	76-322	$2.00
Projections of Degrees and Enrollment in Science and Engineering Fields to 1985	76-301	$1.15
The 1972 Scientist and Engineer Population Redefined		
Volume 1. Demographic, Educational, and Professional Characteristics	75-313	$3.70
Volume 2. Labor Force and Employment Characteristics	75-327	$2.65
Detailed Statistical Tables, Engineers, By Field	76-306	——
R&D Activities of Independent Nonprofit Institutions, 1973	75-308	$1.90

Research and Development in State Government Agencies, Fiscal Years 1972 and 1973	75-303	$1.80
REVIEWS OF DATA ON SCIENCE RESOURCES		
No. 28. "Scientists and Engineers from Abroad. Trends of the Past Decade, 1966-75"	77-305	$0.35
No. 27. "Education and Work Activities of Federal Scientific and Technical Personnel, January 1974"	76-308	$0.40
No. 26. "Energy and Energy-Related R&D Activities of Federal Installations and Federally Funded Research and Development Centers. Funds, FY 1973-75 (est.) and Manpower, Jan. 1973-75 (est.)"	76-304	$0.35
No. 23. "R&D Expenditures of State Public Institutions, Fiscal Year 1973"	75-311	$0.35
HIGHLIGHTS		
"Federal Agencies Allocated Over $4.5 Billion to Universities and Colleges in FY 1975"	76-327	——
"Largest Increase in Employment of Doctoral Scientists and Engineers is in Industrial Sector: 1973-75"	76-326	——
"Energy Increase of 18 Percent Paces Industrial R&D Spending in 1975"	76-324	——